

Operating Instructions

Impact Dot Matrix Printer

KX-P2624



Panasonic

Before operating this unit, please read these instructions completely

FOR USE IN U.K.

CLASS I FOR BS7002

FOR YOUR SAFETY PLEASE READ THE FOLLOWING TEXT CAREFULLY

This appliance is supplied with a moulded three pin mains plug for your safety and convenience. A 5 amp fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amps and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark



or the BSI mark



on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR HOME THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY.

THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO A LIVE SOCKET.

If a new plug is to be fitted please observe the wiring code as shown below.

If in any doubt please consult a qualified electrician

WARNING:- THIS APPLIANCE MUST BE EARTHED.

IMPORTANT:- The wires in this mains lead are coloured in accordance with the following code:-

Green - and - Yellow:

Earth


Blue:

Neutral

Brown:

Live

As the colours of the wire in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the Earth symbol  or coloured GREEN or GREEN-AND-YELLOW.

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.

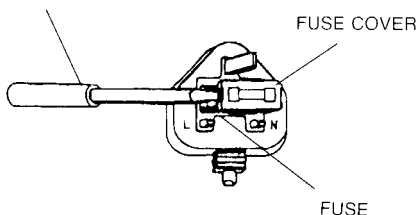
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

SCREW DRIVER

FUSE COVER

How to replace the fuse

Open the fuse compartment with a screwdriver and replace the fuse.



- This equipment is produced to BS800: 1988.

Any details given in these Operating Instructions are subject to change without notice.

WARNING

- Power source voltage of this unit is listed on the nameplate. Do not fail to plug the printer into an outlet with the proper voltage.
- To prevent fire or shock hazard, do not expose this product to rain or any type of moisture.
- When you operate this equipment, the socket-outlet shall be near the equipment and shall be easily accessible.

The serial number of the unit may be found on the label on the rear of the unit. For your convenience, note this number below, and retain this book, along with your proof of purchase, to serve as a permanent record of your purchase in the event of a theft, or for future reference.

MODEL NO. **KX-P2624** NAME OF DEALER _____

SERIAL NO. _____ DATE OF PURCHASE _____

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Microsoft is a registered trademark of Microsoft Corporation.

Apple is a registered trademark of Apple Computer, Inc.

Epson is a registered trademark of Seiko Epson Corporation.

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1. Introduction

1.1 Product Overview

This printer is a versatile, high quality, 24-pin dot matrix printer. It has been comprehensively designed to meet the needs of your office.

This printer features the EZ Set Operator Panel, allowing you to control a wide variety of printing conditions quickly and conveniently. The EZ Set Operator Panel contains 7 switches, 3 indicators and a 16-character Liquid Crystal Display (LCD) to help guide you through various printer operations. The EZ Set Operator Panel allows you to control more than 50 functions including:

- Font selections—3 draft, 7 letter quality (LQ) and 1 super letter quality (SLQ)
- Pitch selections—5, 6, 7.5, 8.5, 10, 12, 15, 17, 20 characters per inch (CPI) and proportional spacing (PS)
- Lines Per Inch selections from 1 through 12 LPI
- Form Length selections from 0.1 through 14.9 inches
- Setting left/right and top/bottom margins
- Setting Super Quiet mode, which reduces printing noise
- Load and save MACROs
- P.CUT, which raises the perforation to the tear bar; eliminates paper waste and maximizes printable area
- Setting Top of Form, which stores the top margin according to the paper path selected
- Displays one of five languages selected
- And more . . .

Other features include a wide carriage paper insertion capability of up to 16.5 inches and the choice of four paper paths: front, rear, top and bottom. In addition, there is a character burst speed of up to 300 characters per second (CPS) in Draft-Micron pitch or 100 cps in letter quality-Micron pitch.

The KX-P2624 contains a 26K internal buffer that is expandable by adding an optional 32K, bringing the total memory capability to 58K. The entire buffer memory can be designated as a receive buffer or a portion can be used as a download area for fonts. The buffer area assignment is selected through the EZ Set Operator Panel.

This printer offers two command sets for greater software compatibility: Epson LQ-1050 and IBM Proprinter XL24E. Either command set can be selected from the EZ Set Operator Panel.

1.2 Specifications

Power requirements: } Please refer to the nameplate located on the
 Frequency: } rear of the printer.
 Current: }

Interface: Centronics parallel
 RS-232C serial interface board (option; KX-PS11,
 KX-P19)

Print Fonts: 3 Draft (Pica, Elite, Micron)
 7 Letter Quality (Courier, Prestige, Bold PS,
 Script, Sans Serif, Roman, Orator)
 1 Super Letter Quality (Roman)

Software Emulation: . . . Epson LQ-1050, IBM Proprinter XL24E

Character Sets: 96 ASCII characters
 96 Italic ASCII characters
 33 International characters
 14 language sets plus 1 legal
 33 Italic International characters
 14 language sets plus 1 legal
 38 Multilingual characters
 158 IBM-PC special characters sets 1 & 2

Dot Configuration: Dot diameter $\frac{1}{127}$ th of an inch (0.2 mm)

	Draft	LQ	SLQ
Matrix			
(Hor. × Ver.)	9 × 24	30 × 24	30 × 48
Dot pitch			
(Horizontal)	$\frac{1}{120}$ "	$\frac{1}{360}$ "	$\frac{1}{360}$ "
	(0.21 mm)	(0.07 mm)	(0.07 mm)
(Vertical)	$\frac{1}{180}$ "	$\frac{1}{180}$ "	$\frac{1}{360}$ "
	(0.14 mm)	(0.14 mm)	(0.07 mm)

Introduction

	Font	Print line size 8" or 13.6"
Maximum number of characters per line (cpl):	Pica (10 cpi)	80 / 136 cpl
	Elite (12 cpi)	96 / 163 cpl
	Micron (15 cpi)	120 / 204 cpl
	Compressed (17 cpi)	137 / 233 cpl
	Elite Compressed (20 cpi)	160 / 272 cpl
	Pica Elongated (5 cpi)	40 / 68 cpl
	Elite Elongated (6 cpi)	48 / 81 cpl
	Micron Elongated (7.5 cpi)	60 / 102 cpl
	Compressed Elongated (8.5 cpi)	68 / 116 cpl
	Elite Compressed Elongated (10 cpi)	80 / 136 cpl

	Font	Speed
Printing Speed of characters per second (cps):	Draft-Pica	200 cps
	Draft-Elite	240 cps
	Draft-Micron	300 cps
	LQ-Pica	66 cps
	LQ-Elite	80 cps
	LQ-Micron	100 cps
	SLQ-Pica	33 cps
	SLQ-Elite	40 cps

Printing Direction: User selectable between Unidirectional (one way printing) or Bidirectional (Printing in both directions)

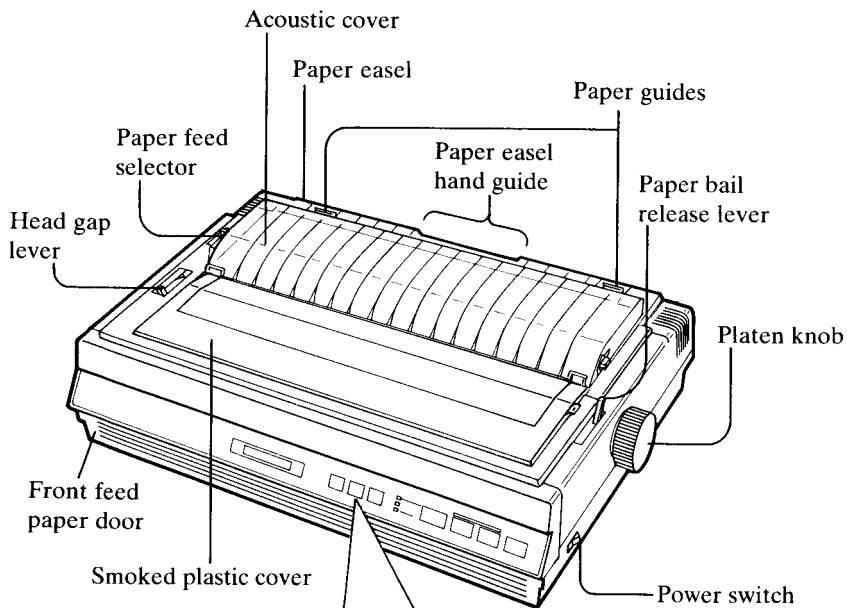
Line Feed Time: Approximately 90 milliseconds for one line, using 1/6 inch (4.2 mm) line feeding (2.5 ips at Form Feed)

Paper Feed: User selectable between pull/push tractor feed, for use with fanfold paper or friction feed for use with single sheet and envelopes

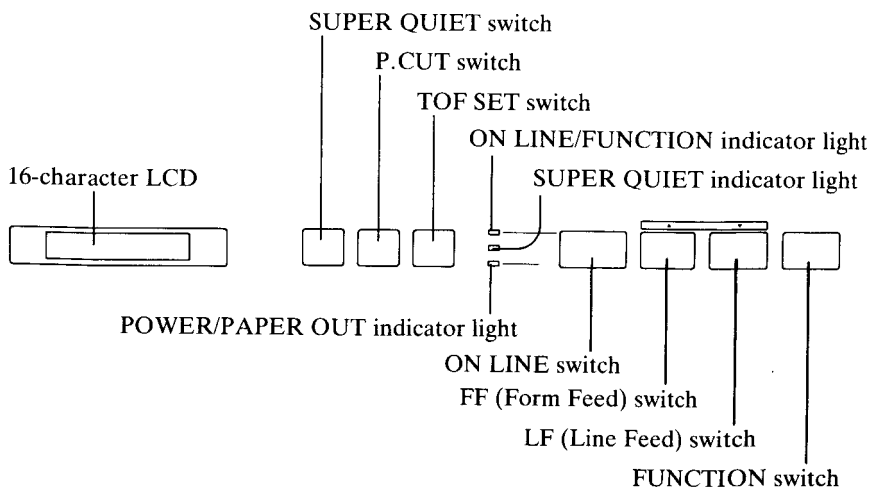
- Paper Used: Fanfold paper:
 Width: 4 to 15.5 inches (102 to 394 mm)
 Weight:
 pull mode: 18 to 24 pounds (68 to 90 g/m²)
 push mode: 16 to 24 pounds (60 to 90 g/m²)
 Single Sheet:
 Width: 4 to 16.5 inches (102 to 420 mm)
 Height: 5 to 14.3 inches (127 to 363 mm)
 Weight: 14 to 24 pounds (53 to 90 g/m²)
 Envelopes: Standard business type, e.g.:
 #6, #10 (refer to Appendix E)
- Copies: Original plus three non-carbon copies
- Paper Thickness: The total thickness of sheets fed through the
 printer must not exceed 0.32 millimeters or 0.013
 inches
- Operating 10 to 35°C, {50 to 95°F}
 Environment: 30 to 80% humidity
 Note: Please allow the printer to stabilize at an
 acceptable room temperature before powering up
- Storage Environment: -20 to 60°C, {-4 to 140°F}
 10 to 90% humidity
- Head Service Life: Approximately 200 million strokes
- Ribbon: Seamless fabric ribbon cassette
 Ink color: black
 Yield: Approx. 3 million characters in draft
 mode (rolling ASCII)
- Dimensions: 590 (W)×398 (D)×172 (H) mm
 {23.2×15.7×6.8 inches}
- Mass {Weight}: Approximately 15.3 kg {33.7 pounds}

1.3 Parts of the Printer

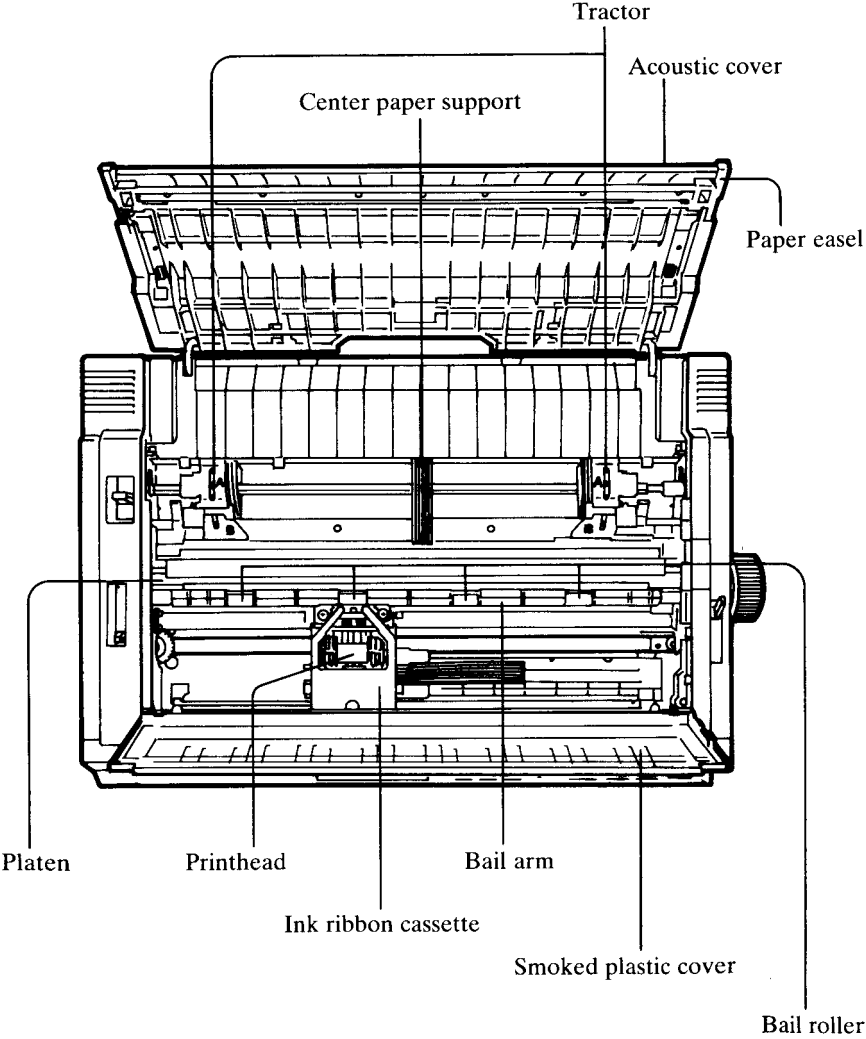
The Front and Right Side View



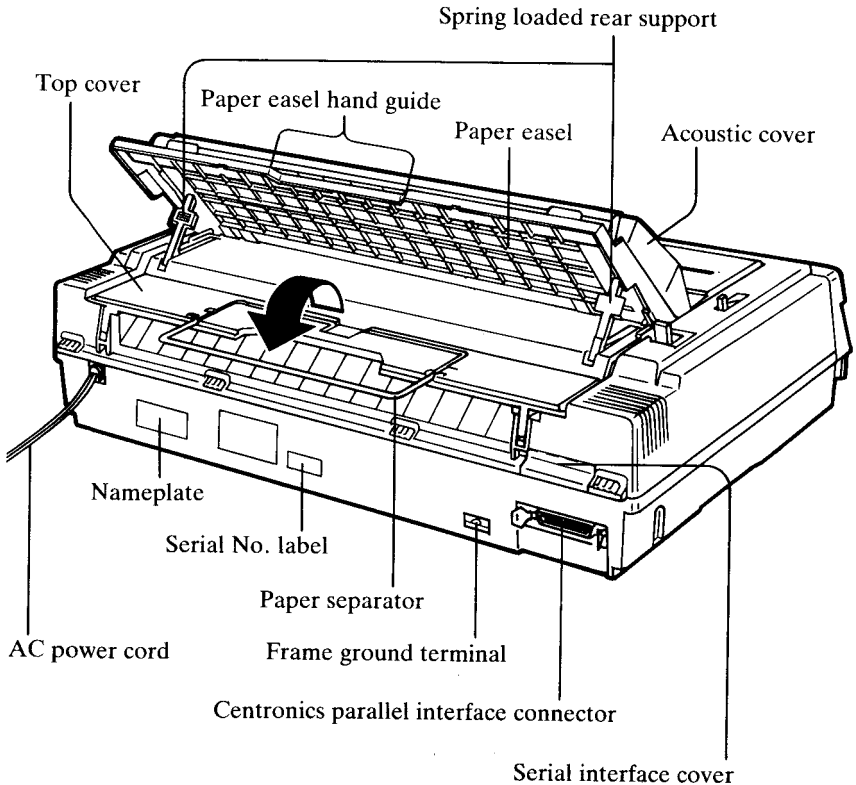
EZ Set Operator Panel



The Top View



The Rear View

**Note:**

The Top Cover is under the paper easel. To open the top cover lift tab on the right side of the acoustic cover. To raise the paper easel lift the paper easel hand guide. To lower the paper easel locate the spring loaded rear supports behind the easel and simultaneously depress the supports. The easel will then lower itself, be careful not to pinch your fingers.

2.1 Site Requirements

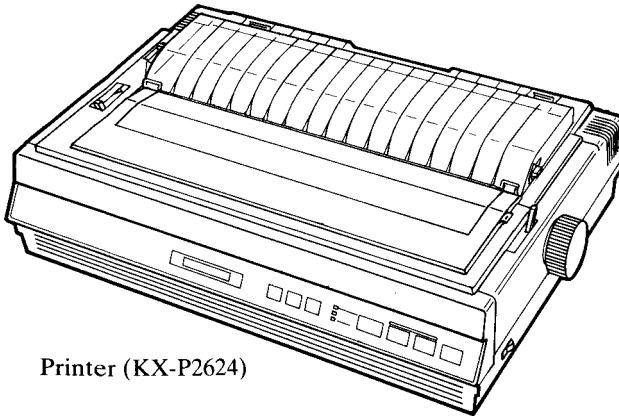
This printer can be installed in any normal office environment. No special wiring or cooling is required.

However, do not use the printer under the following conditions:

- extremely high or low temperature
[temperature range: 10° to 35°C (50° to 95°F)]
- extremely high or low humidity
(humidity range: 30% to 80% RH)
- areas of poor ventilation [a minimum of 10 cm (4") clearance on all sides necessary to insure proper ventilation]
- areas of high dust concentration
- areas with chemical fume concentration
- areas with extreme vibration or when placed on an unstable or unlevelled surface

2.2 Unpacking and Inspection

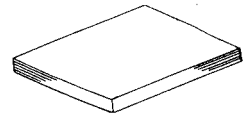
Having opened the shipping carton, carefully remove the contents. Inspect the printer and accessories for damage. Report damage or shortages to the store from which the unit was purchased. Inside the manual's front cover you should record important information regarding the printer.



Printer (KX-P2624)



Ink ribbon cassette
(KX-P155)



Operating manual

Note:

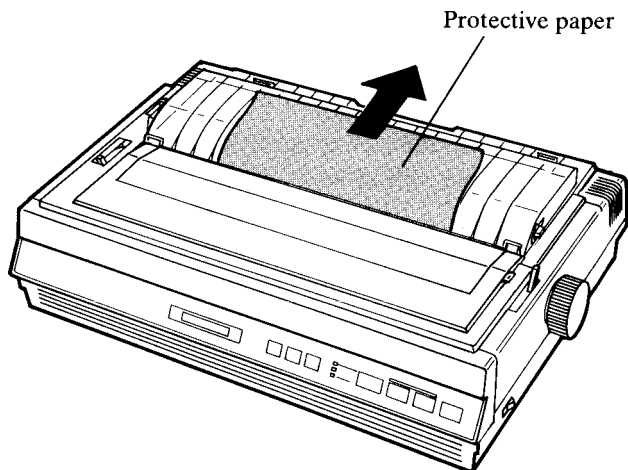
- Please keep all the packing materials so they may be used should you wish to transport the printer in the future. They are specifically designed to protect your printer during shipment.

Set Up

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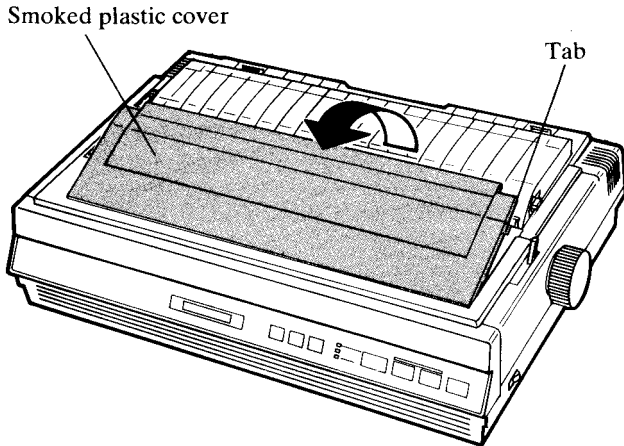
2.3 Initial Set Up

1. Removing the protective paper (if it is installed)

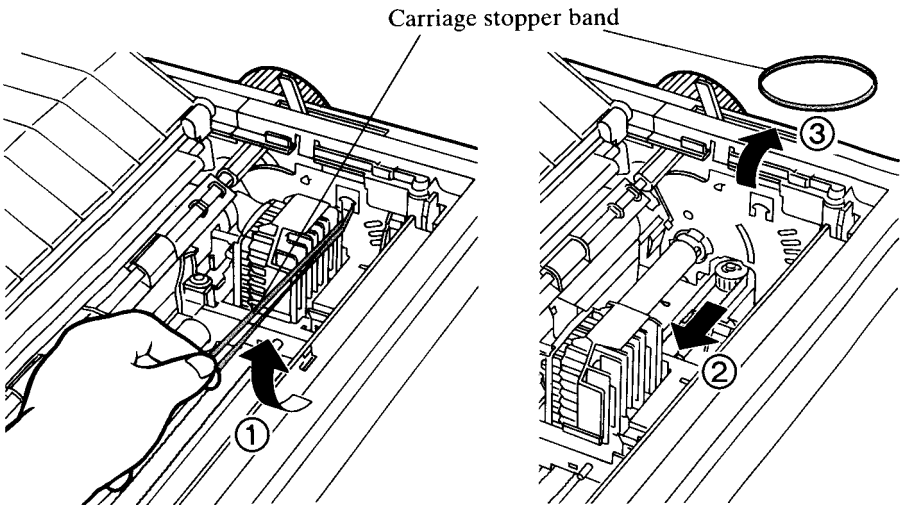


2. Opening the printer covers (removing the carriage stopper band and separator pad)

- (1) Open the smoked plastic cover by holding the tab on the right side of the cover and lifting, as shown:



- (2) Remove the carriage stopper band, as shown:



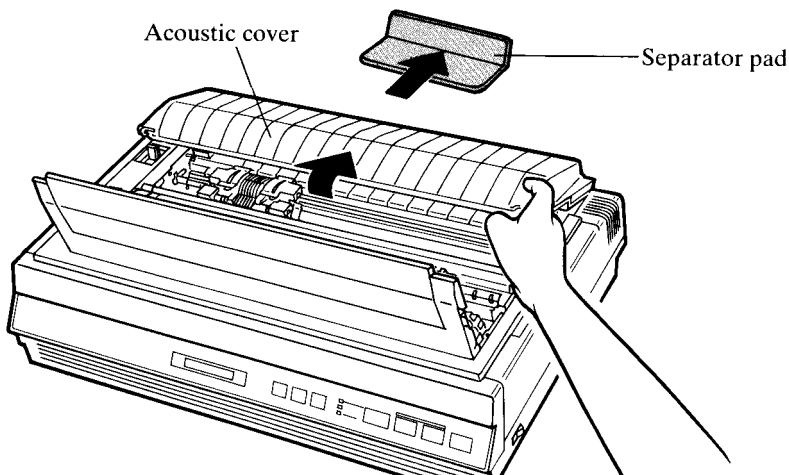
Note:

- Be sure to replace the carriage stopper band before transporting the printer.

Set Up

2

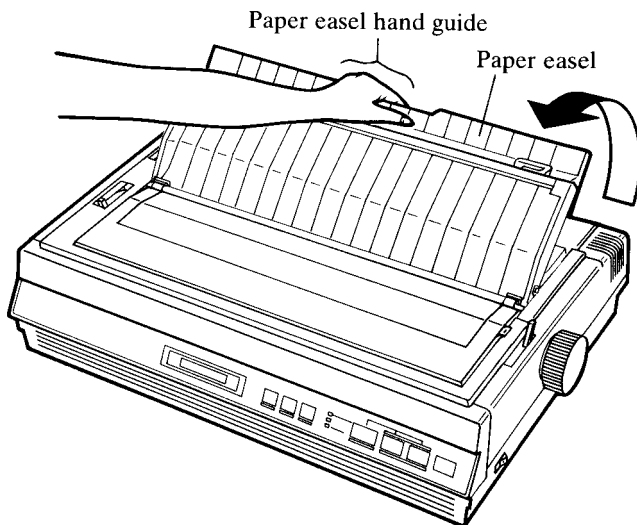
- (3) The top cover is located under the paper easel. Open the top cover by holding the tab on the right side of the acoustic cover and remove the separator pad.



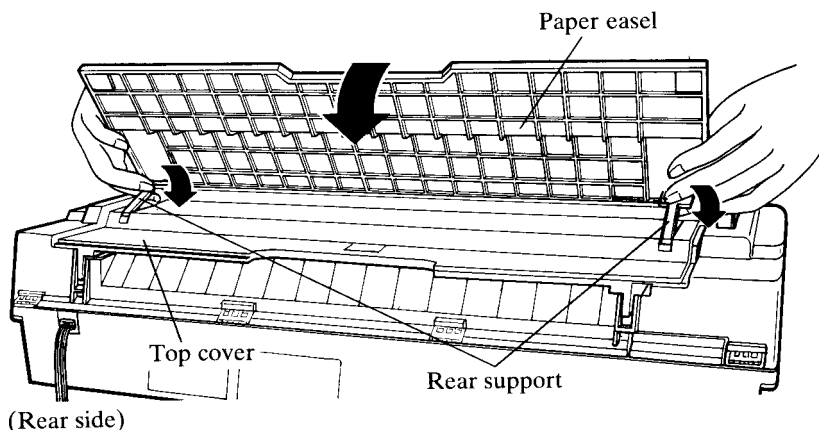
Note:

- To open the printer covers, open the smoked plastic cover first and then open the top cover.
- Be sure to replace the separator pad before transporting the printer.

- (4) To raise the paper easel, lift the paper easel hand guide.



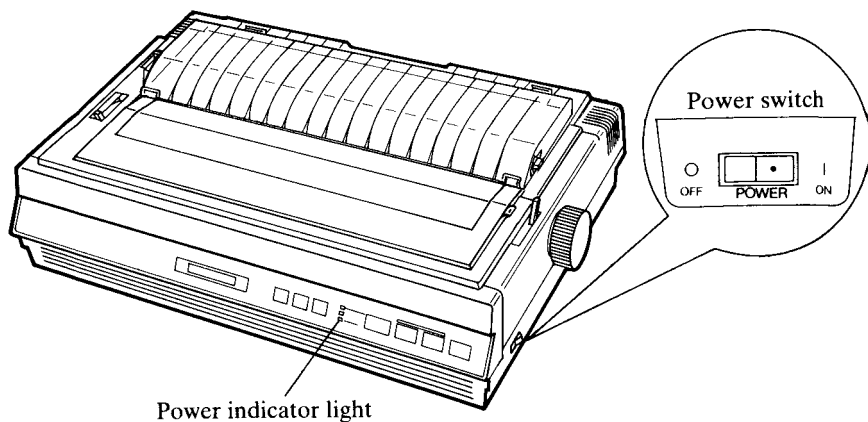
- (5) To lower the paper easel locate the spring loaded rear supports behind the easel and simultaneously depress the supports. The easel will lower itself, **be careful not to pinch your fingers**.



2.4 Power Up

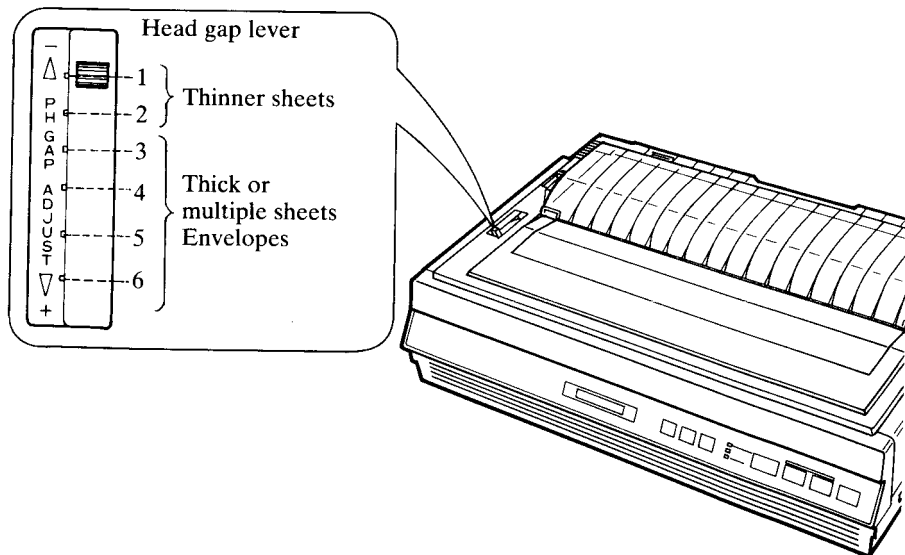
Plug the power cord into an outlet (see nameplate for rating).

The power switch is located on the right side of the printer toward the front. When power is supplied to the printer, the power indicator light on the front panel will be lit.



2.5 Adjusting the Printhead Gap

To compensate for the different thicknesses of paper that will be fed through the unit, there is a head gap lever that allows the operator to adjust the gap between platen and printhead. This is accomplished by moving the lever forward (–) for thin sheets of paper and backward (+) for thick sheets. The lever moves in increments of 0.07 mm (0.0028 of an inch).

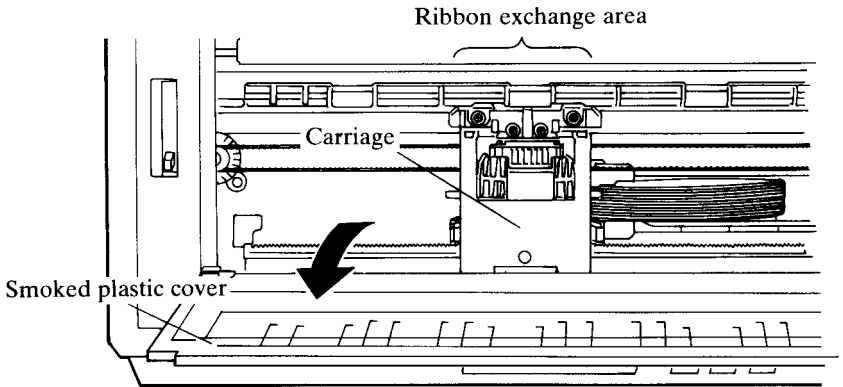


Note:

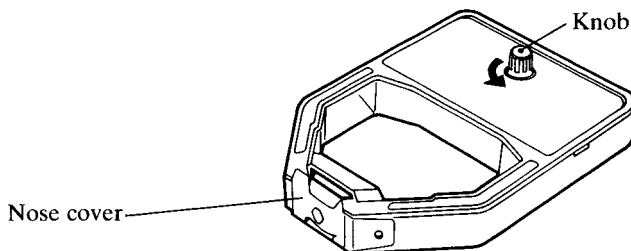
- If an ink smear occurs when loading paper or during printing, move the lever toward the lower position (+) until the smear no longer appears.

2.6 Installing the Ribbon Cassette

1. Turn the power switch to the on position, a beep will sound.
2. Open the smoked plastic cover, this will cause another beep to sound and the carriage will move to the ribbon exchange area automatically. The ribbon can only be exchanged in this area.



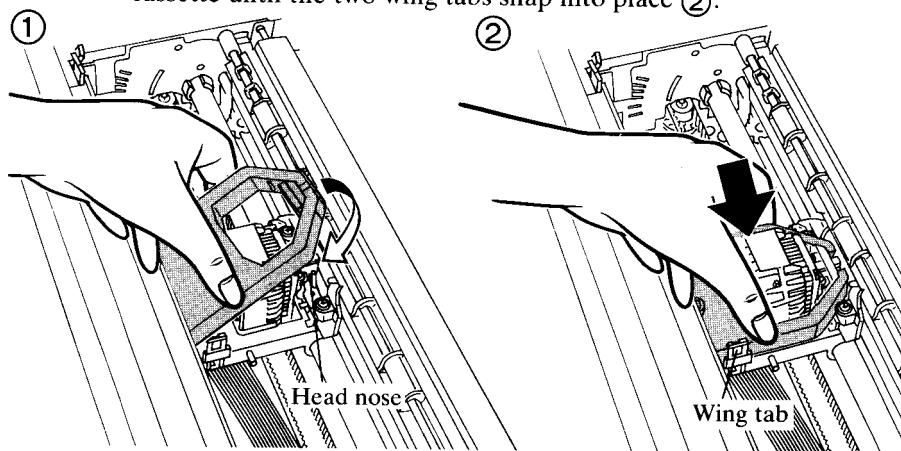
3. Move the head gap lever to the 6 position (greatest gap), refer to the diagram on the previous page.
4. Prior to installing the cassette, remove any slack on the ribbon by rotating the knob on the cassette counterclockwise.



Note:

- **Do not remove the nose cover.** This cover prevents paper from jamming and the ribbon ink from smearing.

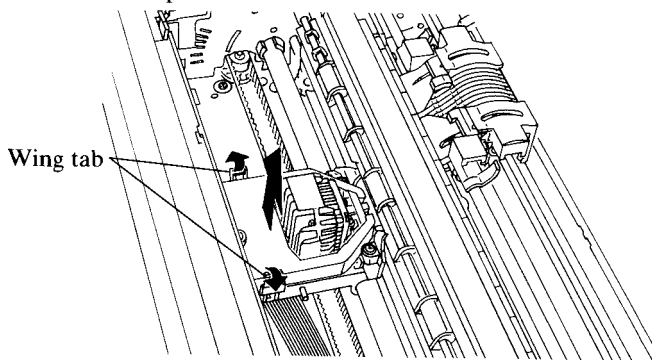
5. Position the cassette over the printhead and lower it in place as shown ①. Visually insure that the ribbon slips in front of the nose of the printhead. Gently, but firmly, press down on rear of the cassette until the two wing tabs snap into place ②.



6. Set the head gap lever to the proper position. Refer to the Section 2.5 on page 2-6.
7. Close the smoked plastic cover.

To remove the ribbon cassette:

With the printer on, open the smoked plastic cover. Spread the wing tabs and lift up the cassette.



Caution:

- Because the printhead may be extremely hot, use caution when cover is open.

2.7 Paper Installation

This printer has two paper feed mechanisms utilized by 4 paper paths. One mechanism is TRACTOR mode for continuously fed paper. In tractor mode you can choose between PUSH or PULL.

MODE	PATH	BEST USED WHEN/FOR
Push	Rear	—doing any type of reverse paper feeding —enabling you to do Paper Parking —using single form continuously fed paper
Pull	Bottom/ Front	—multipart forms —labels

Note:

- For optimum print quality, do not use reverse line feeding in pull mode. If reverse feeding is necessary in pull mode, set REV LF/PULL in the INSTALL menu to ON through the Function mode (see page 3-26).
- Paper Parking is not available in pull mode.
- To avoid paper curl in push mode, park paper after use.

The second paper feed mechanism is FRICTION mode. In friction mode you can feed single sheets or envelopes. These can be fed through the top individually or by using the KX-P38 Cut Sheet Feeder.

A. Fanfold Paper (Tractor PUSH, PULL)


To install fanfold paper follow these procedures:

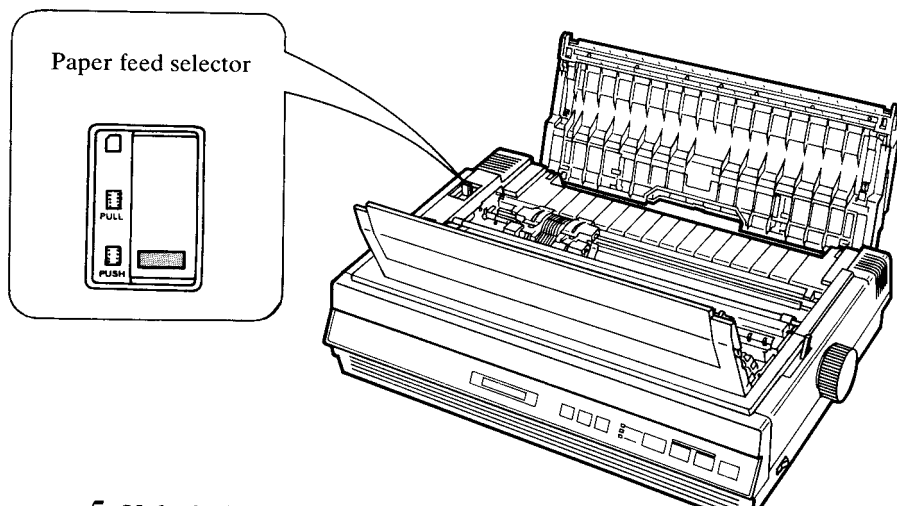
Rear Feeding—**with Push Tractor** (PUSH)

1. Turn the power switch on. A beep will sound once and the PAPER OUT indicator will flash. The display shows “PAPER OUT” or “OFF LINE”. This indicates that there is no paper installed in the printer.
2. Check to make sure that the head gap lever position is appropriate for the thickness of the paper being used. Refer to Section 2.5 on page 2-6.

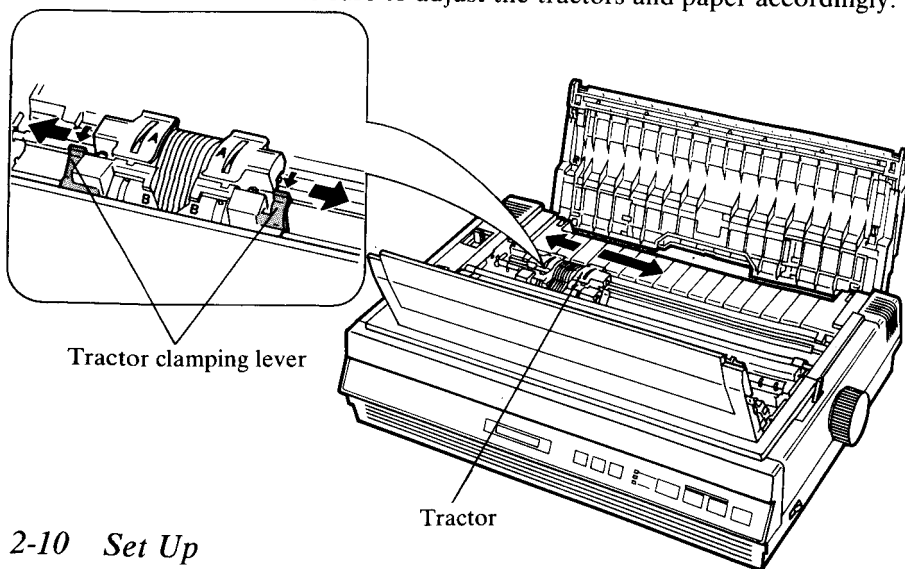
Set Up

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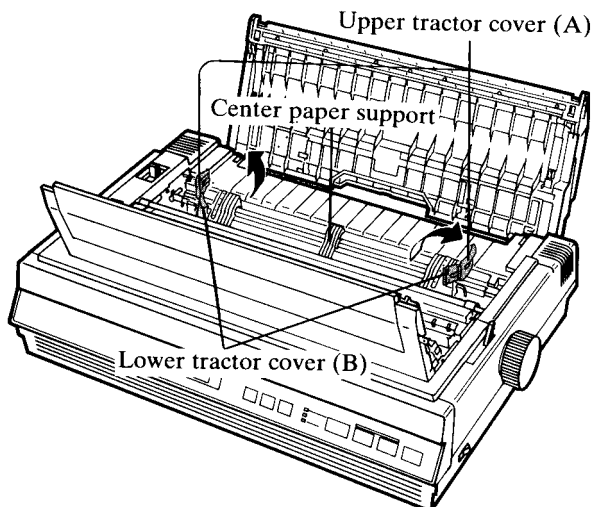
3. Next open the smoked plastic cover and then the top cover (see pages 2-3 and 2-4).
4. Set the paper feed selector to the “ PUSH” position. The display briefly shows “TRACTOR/PUSH”



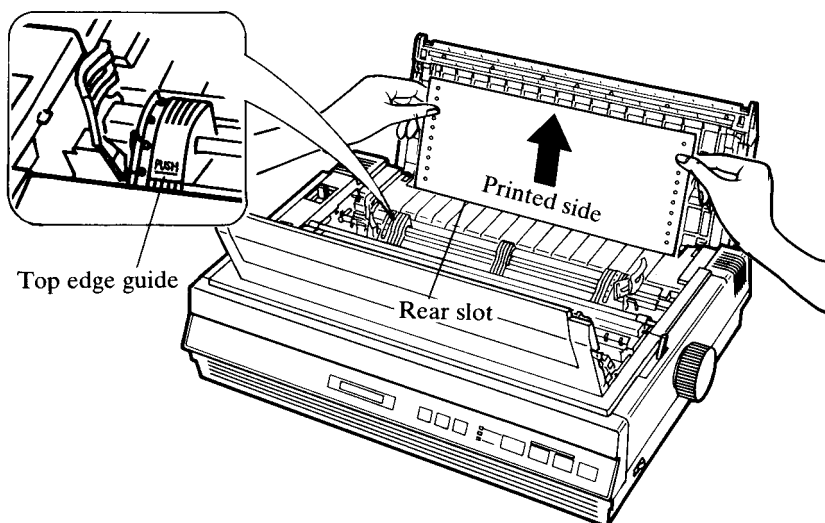
5. Unlock the tractors by pulling the tractor clamping levers forward. Slide the tractors toward the sides of the printer, to accommodate the approximate width of the paper being used. Be aware, that the printer prints between 0 and 130, as marked on the rear cabinet. Therefore make sure to adjust the tractors and paper accordingly.



6. Raise the upper tractor covers (A) **and** the lower tractor covers (B), align the center paper support so that it is centered between the tractors.



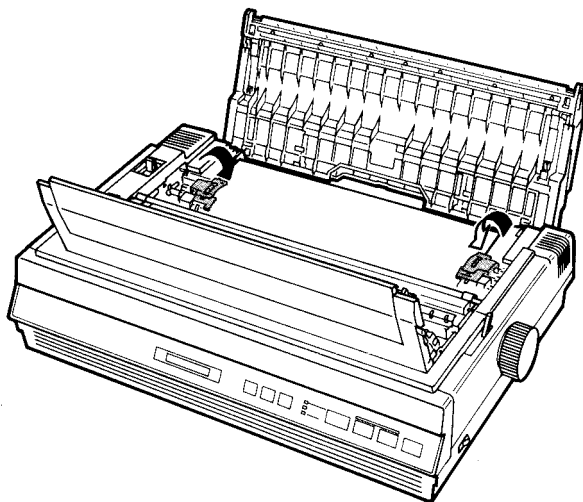
7. Load the fanfold paper through the rear slot with the side on which you wish to print facing down. The top edge of the paper should be in line with the tractors' top edge guide to ensure easy loading.



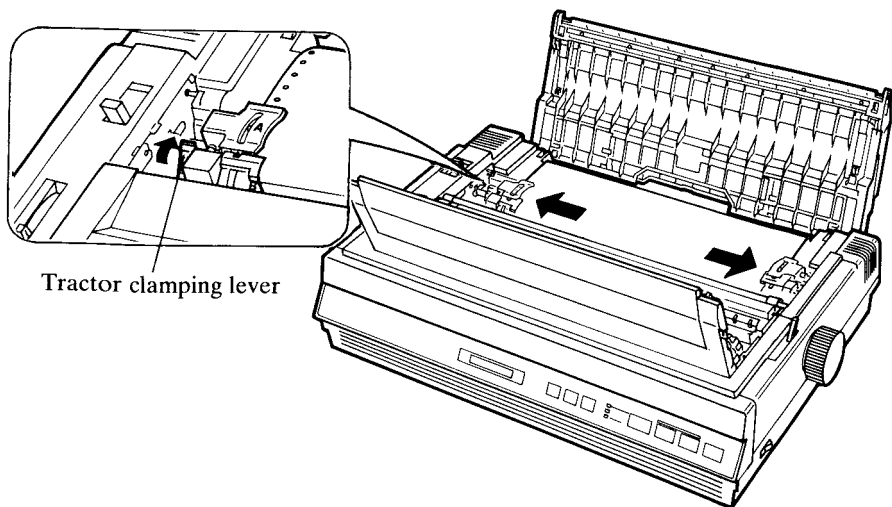
Set Up

2

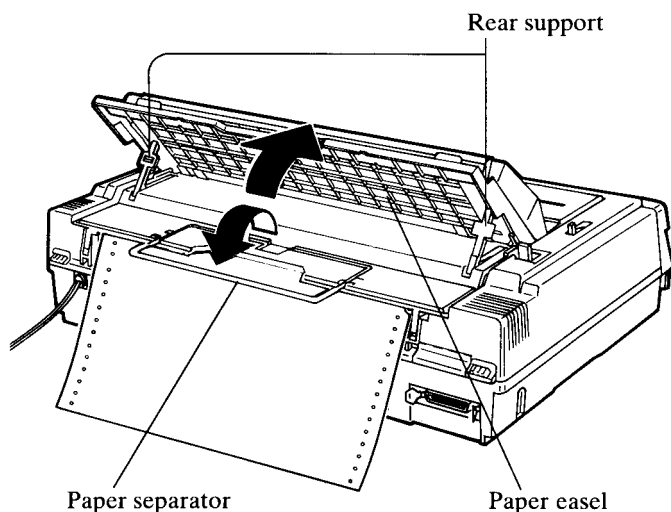
8. Align the paper sprocket holes with the tractor pins and verify that the paper is straight. To ensure that the paper loads easily, and to avoid any possible jams, it is important to load an adequate number of paper sprocket holes with the tractor pins. (See top edge guide.)
9. Close the lower tractor covers (B), then the upper tractor covers (A).



10. Adjust the tractors either left or right to remove any slack. Press back on the tractor clamping levers locking the tractors in place.




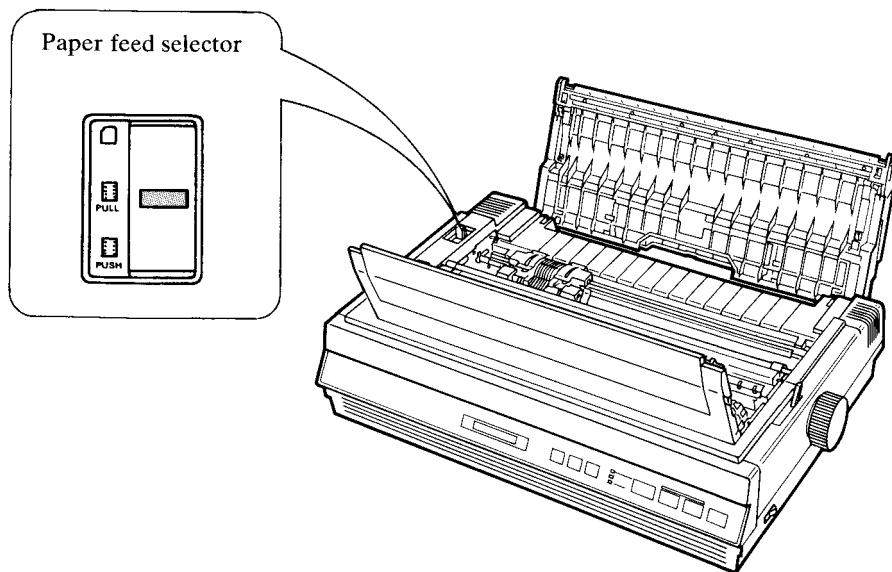
- 11.** To load the paper to the first print line, pull the paper bail release lever to the LOAD/PARK position. The display shows "PAPER LOAD" while the printer is loading the paper, also the PAPER OUT indicator will stop blinking.
- 12.** Close the top cover then the smoked plastic cover. Move the paper bail release lever to the T.PUSH/FRIC position.
- 13.** Raise the paper easel and extend the paper separator.



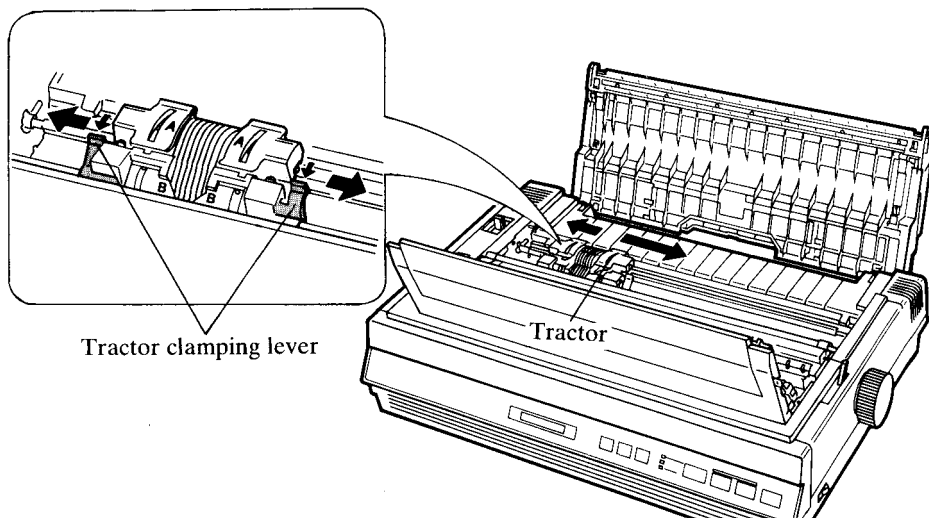
- 14.** Then to lower the paper easel simultaneously depress the rear supports and the easel will lower itself. **Be careful not to pinch your fingers.**
- 15.** You can now adjust your Top of Form position (see page 3-8) or press the **ON LINE** switch to get ready to print.

Front and Bottom Feeding—with Pull Tractor (PULL)

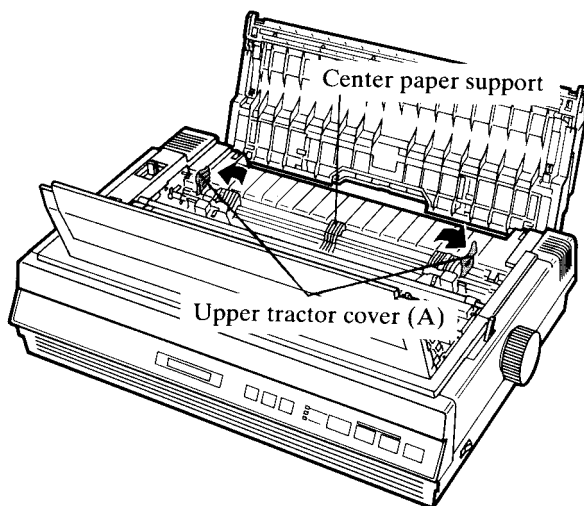
1. Turn the power switch on. A beep will sound once and the PAPER OUT indicator will flash. The display will show “PAPER OUT” or “OFF LINE”, this indicates that there is no paper installed in the printer.
2. Make sure that the head gap lever position is appropriate for the thickness of the paper being used. Refer to Section 2.5 on page 2-6.
3. Open the smoked plastic cover, then the top cover (see pages 2-3 and 2-4).
4. Set the paper feed selector to the “ PULL” position. The display briefly shows “TRACTOR/PULL”.



5. Unlock the tractors by pulling the tractor clamping levers forward. Slide the tractors out toward the sides to the approximate width for the required paper size.



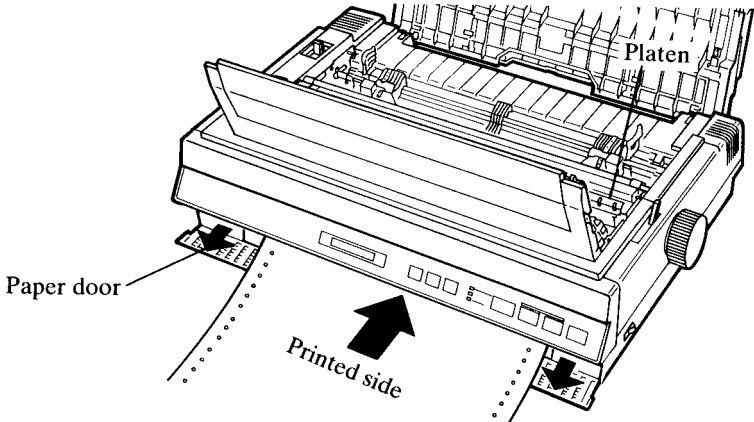
6. Raise only the upper tractor covers (A) and align the center paper support so that it is centered between the tractors.



7. Move the paper bail release lever to the T.PULL position.

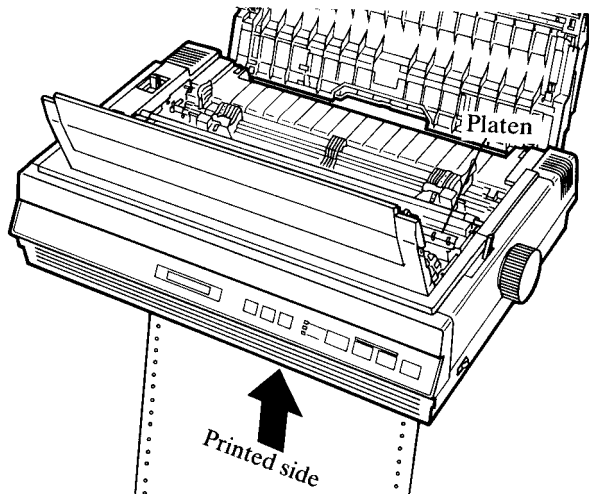
8. When Front Feeding:

Open the paper door on the front of the printer and insert the paper with the side which you wish to print on facing up, until it appears at the platen. The PAPER OUT indicator will be lit.



When Bottom Feeding:

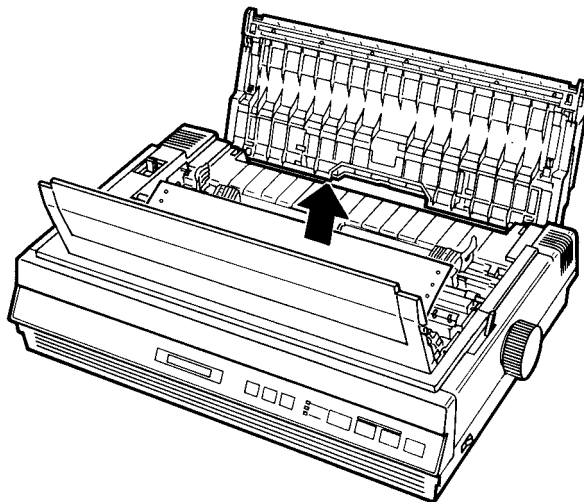
Push the paper up, with the side which you wish to print on facing up, until it appears at the platen. The PAPER OUT indicator will be lit.



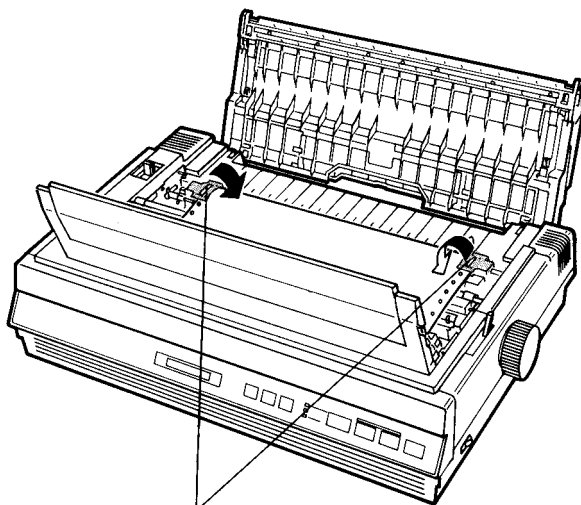
Note:

- When feeding fanfold paper through the front paper door, paper types and conditions may effect accurate line feeding and print quality may not be optimum. For optimum output bottom feed is recommended.

9. Adjust the paper position by pulling it up as shown.

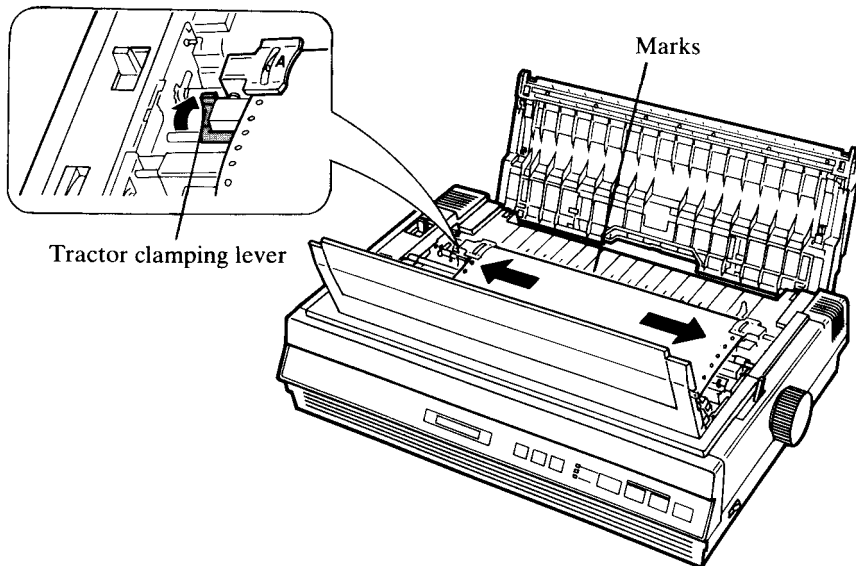


10. Align the paper sprocket holes with the tractor pins. Verify that the paper is straight before closing the upper tractor covers (A).



Upper tractor cover (A)

- 11.** Adjust the tractors either left or right to remove any slack. Align the paper horizontally by using the marks on the rear cabinet as a guide. Press back on the tractor clamping levers locking the tractors in place.



- 12.** Close the top cover, then the smoked plastic cover.

- 13.** Now you can adjust your Top of Form position (see page 3-8) or press the **ON LINE** switch to get ready to print.

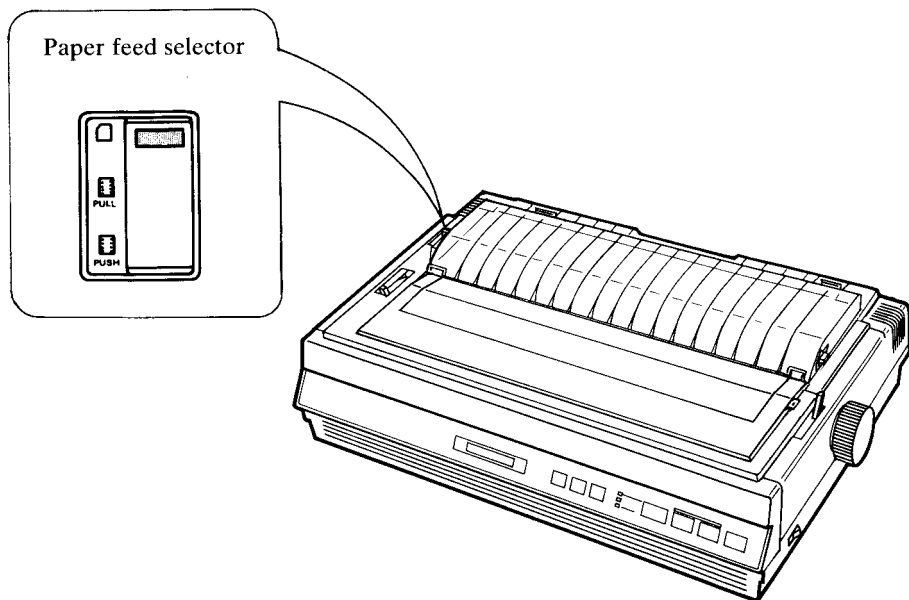
Note:

- In the pull tractor mode, reverse feed functions will not feed paper correctly and the resulting printout may not be correct. If reverse feeding is necessary in pull mode, set REV LF/PULL in the INSTALL menu to ON through the Function mode (see page 3-26).

B. Single Sheets and Envelopes (Friction ☐)

When using a single sheet of paper or an envelope, follow these procedures:

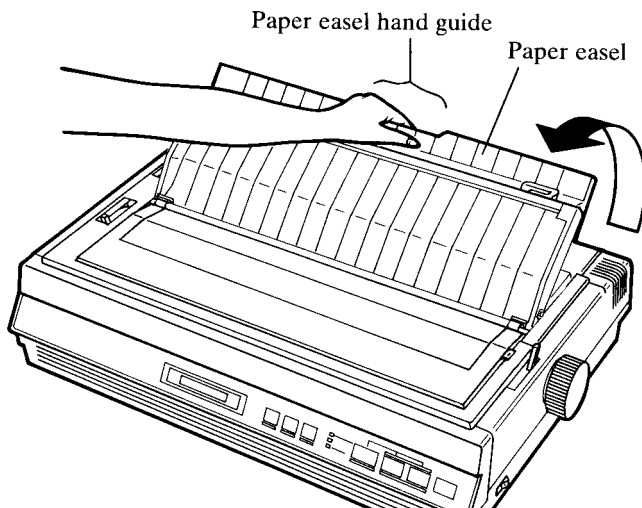
1. Turn the power switch on. A beep will sound once and the PAPER OUT indicator will flash. The display shows "PAPER OUT" or "OFF LINE". This indicates that there is no paper installed in the printer.
2. Make sure that the head gap lever position is appropriate for the thickness of the paper being used. Refer to Section 2.5 on page 2-6.
3. Set the paper feed selector to the "☐" position. The display briefly shows "FRICTION".



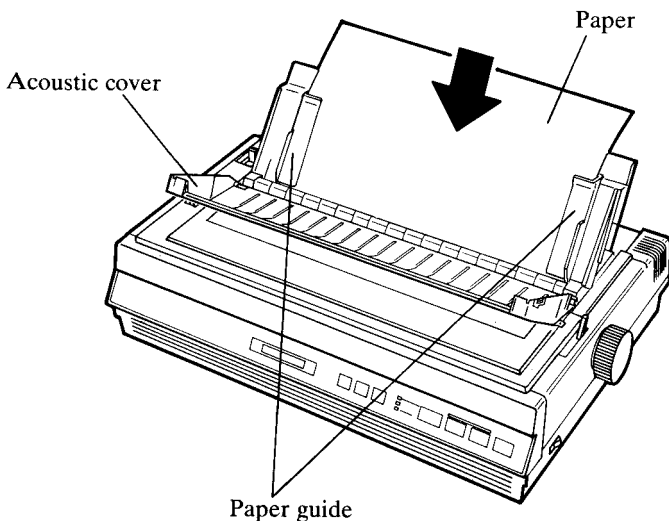
Set Up

2

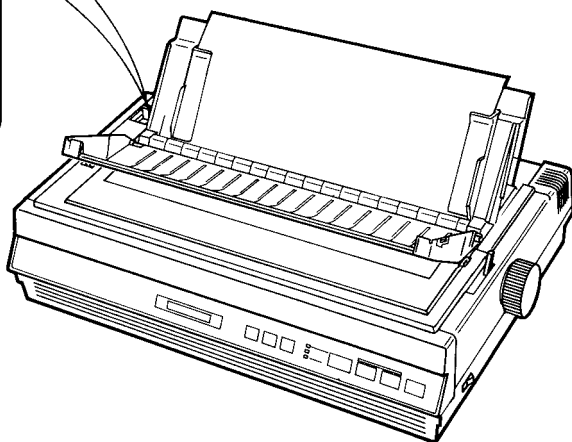
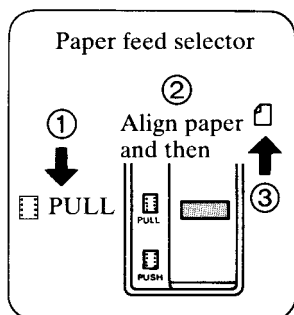
4. Raise the paper easel by lifting the paper easel hand guide.



5. Open the acoustic cover.
6. Separate the paper guides to the approximate width of your paper or envelope. Insert the paper through the paper guides and behind the platen.



7. Pull the paper bail release lever to the LOAD/PARK position to load the paper to the first print line. The display shows "PAPER LOAD" while the printer is loading the paper.
- 8 To align the paper horizontally or vertically, set the paper feed selector to the "PULL" position. This releases the paper and allows the paper to be positioned manually as required. Set the selector back to the "PUSH" position before printing.



9. Close the acoustic cover
10. You can now adjust your Top of Form position (see page 3-8) or press the **ON LINE** switch to get ready to print.

Note:

- To lower paper easel, locate the spring loaded rear supports behind the easel and simultaneously depress the supports. The easel will lower itself, **be careful not to pinch your fingers.**

2.8 Self Test

The printer has a self test feature which allows the user to test the printer. The mode is entered by turning on the power switch **while** pressing the **LF** switch.

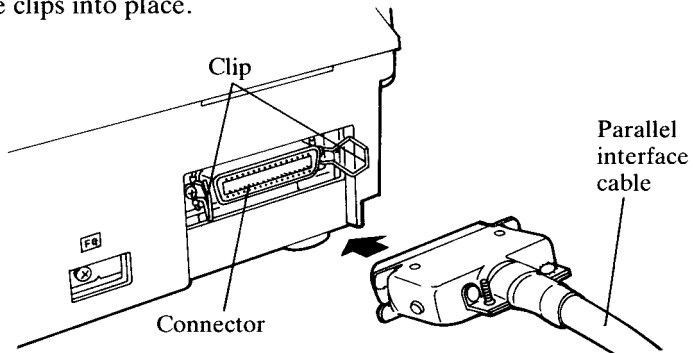
First, all ASCII characters will be printed in draft, the 7 LQ fonts and in SLQ at 10 cpi. Then they will be printed in draft mode for approximately 20 minutes. During this phase, you may change the font by pressing the **P.CUT** switch. The change will not occur until the current line is finished. To exit the self test mode, turn the power switch off.

[illegible]

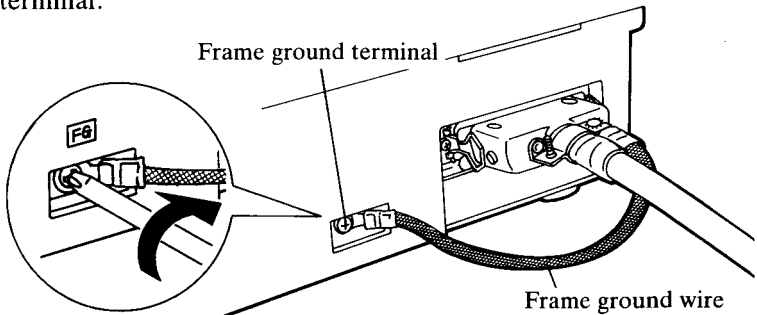
2.9 Connecting Your Printer and Computer

The printer communicates with the computer through an interface cable which you must purchase separately. The printer comes with a centronics parallel interface.

1. Be sure the power switches of both the printer and the computer are turned off.
2. Plug one end of the cable into the connector of the printer and snap the clips into place.



If the cable has a frame ground wire, connect it to the frame ground terminal.



3. Plug the other end of the cable into the connector of the computer.

Note:

- If the connectors are not alike make sure to plug the appropriate end into each device.
- See Section 8 "Interfacing" for detailed information.
- An RS-232C serial interface is available as an option.

3. Operation

3.1 EZ Set Operator Panel

3

This printer has 7 switches, 3 indicators and a 16-character LCD on the EZ Set Operator Panel. The components allow you to configure your printer to communicate properly with the computer and set desired print conditions.

EZ Set Operator Panel Switches/Indicators/LCD

FUNCTION

ENTER/EXIT

FUNCTION Switch

This switch allows you to enter and exit the Function mode. In the Function mode, the EZ Set Operator Panel switches assume new capabilities allowing you to set specific print conditions. (See page 3-10 for detailed information.)

ON LINE

SET

ON LINE Switch

The ON LINE switch opens and closes the communication lines with the computer. When the power switch is turned on and paper is installed, the ON LINE indicator is lit, the display shows "ON LINE", and the printer is ready to receive data from the computer. In the OFF LINE mode, the indicator is out, the display shows "OFF LINE" and the printer can no longer receive data.

In the Function mode, this switch sets the selections or conditions of the item shown on the display.

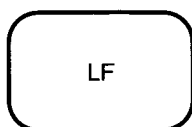
FF



FF (Form Feed) Switch

In the OFF LINE mode, this switch moves the carriage to the center and advances the paper to the top of the next page. Also it has the same function when the printer is not printing in the ON LINE mode.

In the Function mode, this switch allows you to scroll through the main Menu, the Item-menu (Sub-menu) and the selections or conditions of the item.



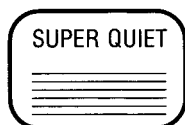
LF



LF (Line Feed) Switch

This switch advances the paper one line at a time, holding the switch down performs multiple line feeds. These functions are active in the OFF LINE mode or when the printer is not printing in the ON LINE mode.

In the Function mode, this switch allows you to scroll back through the main Menu, the Item-menu (Sub-menu) and the selections or conditions of the item.

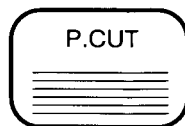


MENU

SUPER QUIET Switch and SUPER QUIET Indicator

Pressing this switch reduces print noise, however it also reduces the printing speed. When it is active, the SUPER QUIET indicator is lit and the display briefly shows "QUIET MODE=ON".

In the Function mode, this switch scrolls through the main Menu on the display.

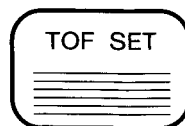


ITEM

P.CUT Switch

Pressing this switch allows you to perform Perforation Cut in the OFF LINE mode or when not printing in ON LINE mode. (See page 3-5 for detailed information.)

In the Function mode, this switch enters and scrolls through the Item-menu (sub-menu).



SELECTION

TOF SET Switch

This switch allows you to set the Top of Form in the OFF LINE mode or when not printing in the ON LINE mode. (See page 3-8 for detailed information.)

In the Function mode, this switch enters and scrolls through the Selection mode for the Item-menu.

ON LINE/FUNCTION Indicator

This indicator is lit when the printer is in the ON LINE mode and out when the printer is in the OFF LINE mode.

In the Function mode, the indicator blinks.

POWER/PAPER OUT Indicator

This indicator is lit when the power switch is turned on and paper is installed. When an out of paper condition occurs, the POWER/PAPER OUT indicator starts blinking.

16-character Liquid Crystal Display (LCD)

This printer has a 16-character LCD to prompt the user with messages and instructions. When you make your settings using the front panel, these messages will guide you through the operation.

In case of any errors in the printer, the display will immediately indicate the appropriate error messages so you may take corrective action.

Feeding the paper

You can adjust the paper position by using the front panel switches when the printer is in the OFF LINE mode or when the printer is not printing in the ON LINE mode.

Form Feed

Pressing the **FF** switch advances the paper to the next top of form position.

Line Feed

Pressing the **LF** switch once advances the paper one line. Holding the switch will advance the paper continuously until the switch is released.

Micro Line Feed

Pressing the **FF** switch **while** pressing the **ON LINE** switch advances the paper one micro line ($\frac{1}{180}$ "). Holding the switch will advance the paper continuously until the switch is released.

Reverse Micro Line Feed

Pressing the **LF** switch **while** pressing the **ON LINE** switch reverses the paper one micro line ($\frac{1}{180}$ "). The printer cannot reverse the paper past the printable area (see Appendix F). Holding the switch will reverse the paper continuously until the switch is released.

Note:

- In the pull tractor mode, Reverse Micro Line Feed will not feed paper correctly and the resulting print out may not be correct.
- When pressing the **FF** or **LF** switch, the amount of paper which is fed is determined by the current setting for lines per inch specified in the Function mode or software command.

This printer has other special features for paper feeding.





Perforation Cut (P.CUT)

This function allows you to advance your fanfold paper's perforation to the tear position. This is not dependent on your top of form position but is dependent on your form length. After tearing off the page you can return your paper to your top of form. This is only available during rear feeding in the push tractor mode.

1. The ON LINE/FUNCTION indicator may be either OFF or ON (if ON, Printer should not be printing) and verify that the paper feed selector is in the "PUSH" position. If the ON LINE indicator is blinking, press the **FUNCTION** switch to exit the Function mode.
2. Press the **P.CUT** switch to advance the paper's perforation to the tear bar.
3. Open the acoustic cover and tear off the page.
4. Press the **P.CUT** switch again. This will reverse the paper back to the top of form.
 - A Top of Form setting (see page 3-8) past the printable area is ignored by P.CUT. P.CUT will use the Top of Form setting that was last saved.
 - If you do not press the **P.CUT** switch the second time, the printer will automatically reverse the paper to the top of form position that was used for the P.CUT function, once data is received.

Automatic Paper Loading (LOAD/PARK)

The paper bail release lever performs a dual function. The use of this lever will reduce the steps and time it takes to load or park your paper. Listed in the chart below is a helpful guide on how the Bail Lever Feed will function with the various paper paths available.

	with Paper Out	with Paper Installed
Push Tractor ( PUSH)	Loads Paper	Parks Paper
Pull Tractor ( PULL)	Feeds Paper	No Action
Friction Feed ()	Feeds Paper	Feeds Paper
Cut Sheet Feeder ()	Loads Paper	No Action

Paper Parking

This function allows you to use single sheets or envelopes without removing or wasting your fanfold paper (in Push tractor mode).


Parking the fanfold paper:

1. Tear off the printed pages. (See P.CUT on page 3-5.)
2. Verify the printer is in the OFF LINE or ON LINE mode. (If the ON LINE/FUNCTION indicator is blinking, press the **FUNCTION** switch.)
3. Pull the paper bail release lever to the LOAD/PARK position. The printer will reverse the fanfold paper to the parked position. While the paper is going back, the display shows "PAPER BACK", and when the paper is parked, the display shows "PAPER OUT" with the PAPER OUT indicator blinking. If the printer is in the ON LINE mode, it automatically goes back to the OFF LINE mode.


Operation

3

Loading the cut sheet paper: (also see paper installation section: Single Sheets and Envelopes page 2-19.)

1. Move the paper feed selector to the “” position. The display briefly shows “FRICTION”.
2. Raise the paper easel by lifting the paper easel hand guide and open the acoustic cover.
3. Separate the paper guides to the approximate width of your paper or envelope. Insert the paper through the paper guides and behind the platen, the PAPER OUT indicator will be lit.
4. Continue to guide the paper into the printer until you feel some resistance.
5. Pull the paper bail release lever to the LOAD/PARK position to load the paper to the first print line. The display shows “PAPER LOAD” while the paper is being loaded.
6. Press the **ON LINE** switch to enable printing. The ON LINE indicator will be lit and the display will show “ON LINE”.
7. When you are finished printing, remove the sheet from the printer by rotating the platen knob.

Reloading the fanfold paper:

1. Move the paper feed selector to the “ PUSH” position.
2. Pull the paper bail release lever to the LOAD/PARK position to advance the fanfold paper to the top of form previously set for this paper path. (See page 3-8.)

Top of Form function

This printer allows you to set and store the first print line position and load the paper to that position automatically. The first print line position will be stored even after the power is turned off. A page is defined by setting the page length through the Function mode or a software command.

Additionally, the printer can store 3 different top of form positions depending on the paper feed method: fanfold paper (FANFOLD PUSH), single sheet (SINGLE SHEET), and single sheet with the Cut Sheet Feeder option KX-P38.

To Set the Top of Form:

1. Set the PAGE LENGTH of the paper you are using through the Function mode (see PAGE FORMAT menu on page 3-21) or software commands (see pages 6-26, 7-20).
2. Load the paper by pulling the paper bail release lever forward (see Section 2.7 on page 2-9 for paper installation).
 - The paper type you insert determines the first print line position for that type. (If using single sheets, you set the top of form for single sheets.)
 - The printer stores the 3 kinds of top margins concurrently.
3. Adjust the paper position by using Line Feed, Micro Line Feed, or Reverse Micro Line Feed (see page 3-4).
 - **Do not rotate the platen knob, the printer will not be able to count the number of lines.**

4. Press the **TOF SET** switch to set the Top of Form for the current position.
 - A Top of Form position will be saved when it is between 0.7 and 5 inches from the top of the page even after the power is turned off. The paper bail release lever pulled to the LOAD/PARK position will advance the paper to the most recently saved Top of Form setting.
 - A Top of Form position set in the area greater than 5 inches will not be saved after the power is turned off, after parking the paper or after using P.CUT.

Note:

- Temporary Top of Form setting is indicated by one beep. Saved Top of Form setting is indicated by two beeps.
- When you use fanfold paper, the Top of Form position must be set on the first page because the printer does not accept a top margin which is longer than one page.

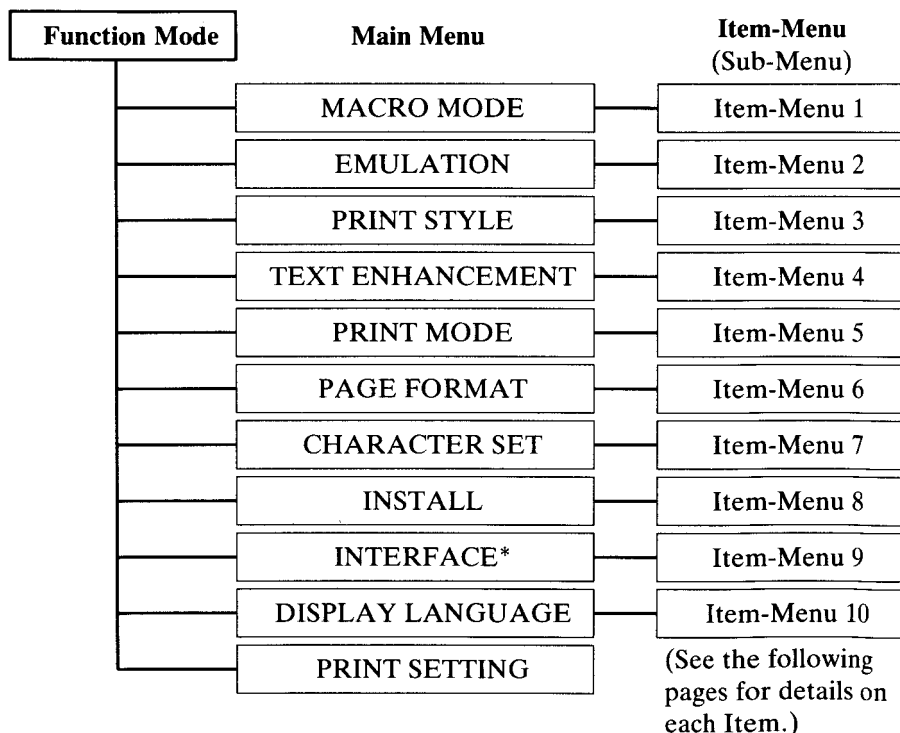
3.2 Function Mode

The features in the Function mode give a new dimension to your printing capabilities.

To enter the Function mode, press the **FUNCTION** switch in the OFF LINE mode or when the printer is not printing in the ON LINE mode. The ON LINE indicator blinks, the display briefly shows “FUNCTION MODE”, then it changes to “MACRO MODE”.

To exit the Function mode, press the **FUNCTION** switch again. The Function mode is composed of a main Menu and Item-menus (Sub-menu) that allow you to select modes and parameters.

These menus are diagrammed in the following flow chart:



* The INTERFACE menu (Item-Menu 9) is only displayed when the optional KX-PS11, RS-232C Serial interface board is installed.

Operation

3

When you are in the main Menu of the Function mode, the **SUPER QUIET** (MENU) switch scrolls through the subjects in the main Menu.

By pressing the **P.CUT** (ITEM) switch, you enter the Item-menu (Sub-menu).

The subjects of the Item-menu (shown on the left side of the display) are scrolled through by holding down the **P.CUT** (ITEM) switch.

These menus (the main Menu and the Item-menu) are also scrolled forward or backward by pressing the **FF** (▲) or **LF** (▼) switch respectively.

By pressing the **TOF SET** (SELECTION) switch in the Item-menu, you enter the selection mode and you can scroll through the selections (shown on the right side of the display) of the Item-menu by pressing the **FF** (▲) or **LF** (▼) switch.

When “=” is displayed between the Item-menu and the set selection such as “POWER ON MACRO=1”, that is the current setting.

The Item-menu without “=” indicates a setting which is not currently set but can be selected by pressing the **ON LINE** (SET) switch.

Note:

- All settings made are temporary unless saved in Macro.
- Temporary settings are lost when power is turned off.
- The desired settings when power is turned on should be stored as POWER ON MACRO. (See page 3-12.)

(1) MACRO MODE Menu

The MACRO MODE Item-menu allows you to load or save a MACRO easily as well as recall the FACTORY setting.

The following table lists all of the items you can select in the MACRO MODE Item-menu.

Main Menu	Item-Menu 1	Selection	Function
MACRO MODE	LOAD MACRO	#1	Loads MACRO #1, #2, #3, #4 or FACTORY setting. FCTRY: FACTORY
		#2	
		#3	
		#4	
		FCTRY	
	SAVE MACRO	#1	Saves a combination of all your settings (except for the Top of Form set), set in the Function mode, into the printer's memory as MACRO #1, #2, #3, #4.
		#2	
		#3	
		#4	
	POWER ON MACRO	1	Recalls (loads) a MACRO or the FACTORY setting automatically when the power switch is turned on. F: FACTORY
		2	
		3	
		4	
		F	

MACROs

A MACRO allows you to store a combination of your most frequently used print conditions (all settings in the Function mode) into the printer's memory which can be easily recalled and/or changed. This will enable you to recall one of 4 combinations (MACROs #1, #2, #3, #4) at the touch of a button eliminating the need to reset all your features each time you have a print job that uses a previously set combination.

FACTORY setting: Default setting (LOAD MACRO FCTRY and POWER ON MACRO F) is for recalling all the settings in the Function mode as they were originally set when the printer was shipped. However, it does not change any of the settings which are stored in MACRO#1, 2, 3 or 4. To do so, after recalling the Factory setting, you must save each Macro individually.

Note:

- The FACTORY settings in the Function mode depend on the countries where the units are shipped. To confirm the FACTORY settings of your country, print them out with the steps at page 3-30 (PRINT SETTING menu).

Setting the MACRO MODE Menu

1. Verify the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Before you can save a MACRO, you must set the print features you wish to store (all settings in the Function mode) as the current settings. (See page 3-14 through 3-29.)
4. Press the **SUPER QUIET** (MENU) switch until the display shows "MACRO MODE". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **P.CUT** (ITEM) switch until the Item-menu you wish to enter is shown on the left side of the display. You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
6. Press the **TOF SET** (SELECTION) switch to select a parameter and then select a MACRO number or FACTORY you wish to set (shown on the right side of the display) by pressing the **FF** (▲) or **LF** (▼) switch.

7. Press the **ON LINE** (SET) switch to set the desired selection (mode).
8. Press the **FUNCTION** switch to exit the Function mode.

(2) EMULATION Menu

The EMULATION menu allows you to select EPSON or IBM emulation mode as shown below.

Main Menu	Item-Menu 2	Selection	Function
EMULA-TION	EMULATION	EPSON	Sets the emulation mode to Epson LQ-1050 or IBM Proprinter XL24E.
		IBM	

Selecting the EMULATION Menu

1. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "EMULATION". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
4. Press the **P.CUT** (ITEM) switch. The display will show "EMULATION EPSON" or "EMULATION IBM". If the mode you want is not displayed, press the **TOF SET** (SELECTION) switch and then press the **FF** (▲) or **LF** (▼) switch to display the one you wish to select.
5. Press the **ON LINE** (SET) switch to set the desired selection (mode).
6. Press the **FUNCTION** switch to exit the Function mode.

(3) PRINT STYLE Menu

This menu allows you to select the desired font and pitch. Section 5.1 gives you detailed information about font and pitch.

The following table lists all of the items you can select in the PRINT STYLE menu.

Main Menu	Item-Menu 3	Selection	Function
PRINT STYLE	FONT	DRAFT	Selects Draft, LQ (Letter Quality) or Super LQ font.
		BOLD PS	
		COURIER	
		ORATOR	
		PRESTIGE	
		ROMAN	
		SANS SERIF	
		SCRIPT	
		SUPER LQ	
	PITCH	# CPI	#: 5, 6, 7.5, 8.5, 10, 12, 15, 17, 20 Selects the desired characters per inch (cpi) or Proportional Spacing.
		PROPORTION	

Selecting the PRINT STYLE Menu

1. Verify that the **ON LINE/FUNCTION** indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "PRINT STYLE". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
4. Press the **P.CUT** (ITEM) switch. The display will show "FONT" on the left side. If you want to set pitch, press the **P.CUT** (ITEM) switch again to show "PITCH".
5. Press the **TOF SET** (SELECTION) switch and then select the font or pitch you wish to set (shown on the right side of the display) by pressing the **FF** (▲) or **LF** (▼) switch.
6. Press the **ON LINE** (SET) switch to set the desired selection.
7. Press the **FUNCTION** switch to exit the Function mode.

Note:

- The Draft font when combined with Proportional spacing is a restricted combination and should not be used.
- The Super LQ font can only be combined with 5, 6, 10 and 12 cpi.

(4) TEXT ENHANCEMENT Menu

This menu allows a document to have a variety of print styles. Section 5.1 gives you a sampling of the features (see page 5-3).

The following table lists all of the items you can select in the TEXT ENHANCEMENT menu.

Main Menu	Item-Menu 4	Selection	Function
TEXT ENHANCE- MENT	BOLD	OFF	Performs (ON) or doesn't perform (OFF) bold printing.
		ON	
	DBL HIGH	OFF	Performs (ON) or doesn't perform (OFF) double high printing.
		ON	
	DBL STRIKE	OFF	Performs (ON) or doesn't perform (OFF) double strike printing.
		ON	
	DBL WIDE	OFF	Performs (ON) or doesn't perform (OFF) double wide printing.
		ON	
	ITALICS	OFF	Performs (ON) or doesn't perform (OFF) italic printing.
		ON	
	OUTLINE	OFF	Performs (ON) or doesn't perform (OFF) outline printing.
		ON	
	SHADOW	OFF	Performs (ON) or doesn't perform (OFF) shadow printing.
		ON	
	ZERO SLASH	OFF	Sets zero slash character Ø (ON) or 0 (OFF). (When the International Character Set is set to Norway, zero slash is printed as 0.)
		ON	

Setting the TEXT ENHANCEMENT Menu

1. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "TEXT ENHANCEMENT". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
4. Press the **P.CUT** (ITEM) switch until the Item-menu you wish to enter is shown on the left side of the display. You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **TOF SET** (SELECTION) switch and then select "ON" or "OFF" by pressing the **FF** (▲) or **LF** (▼) switch.
6. Press the **ON LINE** (SET) switch to set the desired selection (condition).
7. Press the **FUNCTION** switch to exit the Function mode.

Note:

- Enhancements are independent and are set individually. Therefore, any enhancement can be set with another.

Operation

3

(5) PRINT MODE Menu

This menu allows you to select the desired print control.

The following table lists all of the items you can select in the PRINT MODE menu.

Main Menu	Item-Menu 5	Selection	Function
PRINT MODE	G.DIRECTION (Graphics)	UNI	Graphics print left-to-right only.
		BI	Graphics are printed in both directions.
	T.DIRECTION (Text)	UNI	Text prints left-to-right only.
		BI	Text is printed in both directions.
	PRNT WIDTH	13.6"	Sets the print width to 13.6 inches or 8 inches (the number of columns will depend on pitch).
		8"	
	PANEL LOCK	OFF	Software commands override all the settings in the Function mode.
		FONT	Font setting in the Function mode overrides software command.
		PITCH	Pitch setting in the Function mode overrides software command.
		F&P	Font and Pitch settings in the Function mode override software commands.
		ALL	All settings in the Function mode override software commands.

PANEL LOCK

PANEL LOCK in the PRINT MODE menu is the function which decides the priority between the Function mode setting and the software commands. The selection column of PANEL LOCK on the previous page shows which is given first priority, the Function mode setting or the software command.

Setting the PRINT MODE Menu

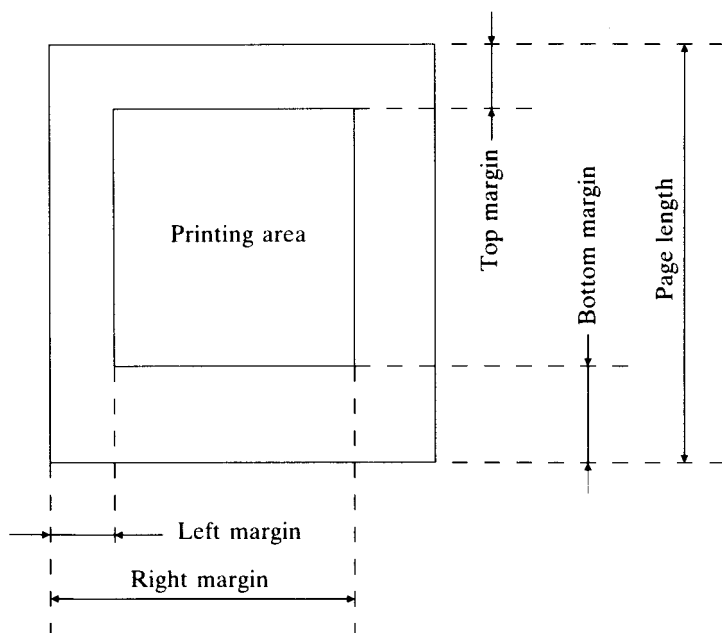
1. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "PRINT MODE". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
4. Press the **P.CUT** (ITEM) switch until the Item-menu you wish to enter is shown on the left side of the display. You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **TOF SET** (SELECTION) switch and then select the setting you wish (shown on the right side of the display) by pressing the **FF** (▲) or **LF** (▼) switch.
6. Press the **ON LINE** (SET) switch to set the desired selection (condition).
7. Press the **FUNCTION** switch to exit the Function mode.

(6) PAGE FORMAT Menu

This menu allows you to select the desired lines per inch, page length, top margin, bottom margin, left margin, right margin and center position of the printhead as shown below. The page formatting selections offered through your printer's front panel are provided for software packages that may lack these features. However, if your software does provide these same features we recommend that you set or leave your printer to the factory default settings to eliminate any conflicts.

Main Menu	Item-Menu 6	Selection	Function
PAGE FORMAT	LINES/INCH	#	#: 1 to 12 The number increases or decreases by 0.5 (excluding 3.5, 5.5, 6.5, 7.0, 8.5, 9.5, 10.5, 11, 11.5).
	P.LENGTH (Page length)	#"	#: 0.1 to 14.9" The number increases or decreases by 0.1.
	T.MRGN (Top margin)	#"	#: 0.00 to 2.50" The number increases or decreases by 0.05.
	B.MRGN (Bottom margin /skip perforation)	#"	#: 0.00 to 4.90" The number increases or decreases by 0.05.
	L.MRGN (Left margin)	#	#: 0 to 134/10 CPI The number increases or decreases by 1. The value number depends on the CPI which has been selected.
	R.MRGN (Right margin)	#	#: 2 to 136/10 CPI The number increases or decreases by 1. The value number depends on the CPI which has been selected.
	CTR PRINthead (Center)	#	#: 10 to 80 The number increases or decreases by 1. Selects the center position for the printhead.

Page formatting is determined by the page length, left/right margin (which sets the margin on the left/right side of the paper) and top/bottom margin (which sets the margin on the upper/lower end of the paper) as shown below.



Setting the PAGE FORMAT Menu

1. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "PAGE FORMAT". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.

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4. Press the **P.CUT** (ITEM) switch until the Item-menu you wish to enter is shown on the left side of the display. You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **TOF SET** (SELECTION) switch and then select the number you wish (shown on the right side of the display). Press the **FF** (▲) or **LF** (▼) switch to increase or decrease the number.
6. Press the **ON LINE** (SET) switch to set the desired selection (number).
7. Press the **FUNCTION** switch to exit the Function mode.

Note:

- When the Item-menu is L.MRGN or R.MRGN, the **FF** or **LF** switch moves the carriage right or left. Pressing the **FF** or **LF** switch when the carriage reaches the end of the platen moves it to the opposite side. This is helpful in moving the carriage to the second margin position when the first is far from it.
- You can set either the left or the right margin first.
- If the left margin is set to the right of the right margin, the right margin is reset to 136 (10 cpi) automatically.
- When the PRINT WIDTH is changed, the left margin will default to 0" and the right margin will default to 8" or 13.6" automatically depending on your selection of the print width. Please refer to the chart on page 1-3 for the Maximum number of characters per line, according to your pitch selection.
- The skip perforation command overrides the front panel Bottom margin setting.

(7) CHARACTER SET Menu

This menu allows you to select the desired character set.

The following table lists all of the items you can select in the CHARACTER SET menu.

Main Menu	Item-Menu 7	Selection	Function
CHARACTER SET	COUNTRY	USA	Selects one of 14 language or legal character sets.
		DENMARK1	
		DENMARK2	
		FRANCE	
		GERMANY	
		ITALY	
		JAPAN	
		KOREA	
		LTN AMER	
		LEGAL	
		NORWAY	
		SPAIN1	
		SPAIN2	
		SWEDEN	
		UK	
	CHR SET	ITALIC	Selects the italics (Epson mode only) or graphics/ character sets 1 or 2 (Epson mode or IBM mode).
		GRAPH1	
		GRAPH2	
	CODE PAGE	USA	Selects the USA or multilingual code page in IBM mode only.
		MULT	

Setting the CHARACTER SET Menu

1. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "CHARACTER SET". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
4. Press the **P.CUT** (ITEM) switch until the Item-menu you wish to enter is shown on the left side of the display. You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **TOF SET** (SELECTION) switch and then select the setting you wish (shown on the right side of the display) by pressing the **FF** (▲) or **LF** (▼) switch.
6. Press the **ON LINE** (SET) switch to set the desired selection
7. Press the **FUNCTION** switch to exit the Function mode.

(8) INSTALL Menu

This menu allows you to select the initial setup conditions (this replaces the need for DIP Switches).

The table on this page and the following page shows all of the items you can select in the INSTALL menu.

Main Menu	Item-Menu 8	Selection	Function
INSTALL	AGM/IBM	OFF	Sets Alternate Graphics Mode on or off in the IBM mode.
		ON	
	AUTO CR/IBM	OFF	Activates (ON) or prevents (OFF) Automatic CR on LF, VT, ESC+“J”. (This setting is effective only in the IBM mode.)
		ON	
	AUTO LF	OFF	Activates (ON) or prevents (OFF) Automatic LF after CR.
		ON	
	BUZZER	OFF	Buzzer sounds (ON) or doesn't sound (OFF).
		ON	
	D.LENGTH	8 BIT	Sets data length to 7 bit or 8 bit.
		7 BIT	
	P.O.DETECT	OFF	Paper Out Detector is active (ON) or ignored (OFF).
		ON	
	QUIET MODE	OFF	Reduces (ON) or doesn't reduce (OFF) the printing noise. (May also be set out of the Function mode on the front panel and then can be stored in a MACRO.)
		ON	
	REV LF/PULL	OFF	Sets Reverse Line Feed in Pull mode on or off.
		ON	

Operation

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Main Menu	Item-Menu 8	Selection	Function
INSTALL	TEAR OFF	MANUAL	Doesn't advance the paper's perforation to the tear off position without pressing the P.CUT switch.
		AUTO	Advances the paper's perforation to the tear off position automatically.
	CSF MODE	OFF	Cut Sheet Feeder is installed (ON) or not (OFF). This setting is effective only when the paper feed selector is in "□" position and the C.S.F. option (KX-P38) is installed.
		ON	
	OPT RAM	BUFFER	Sets the option RAM to buffer or download. (KX-P43 must be installed.)
		DOWNLOAD	

Setting the INSTALL Menu

1. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "INSTALL". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
4. Press the **P.CUT** (ITEM) switch until the Item-menu you wish to enter is shown on the left side of the display. You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **TOF SET** (SELECTION) switch and then select the setting you wish (shown on the right side of the display) by pressing the **FF** (▲) or **LF** (▼) switch.
6. Press the **ON LINE** (SET) switch to set the desired selection (condition).
7. Press the **FUNCTION** switch to exit the Function mode.

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(9) DISPLAY LANGUAGE Menu

This menu allows you to select one of five display languages. All messages shown on the display can be changed into the language you select and set.

Main Menu	Item-Menu 10	Selection	Function
DISPLAY LANGUAGE	LANGUAGE	ENGLISH	Selects the display language.
		FRENCH	
		GERMAN	
		SPANISH	
		ITALIAN	

Selecting the DISPLAY LANGUAGE Menu

1. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
2. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
3. Press the **SUPER QUIET** (MENU) switch until the display shows "DISPLAY LANGUAGE". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
4. Press the **P.CUT** (ITEM) switch. The display shows "LANGUAGE" on the left side. You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **TOF SET** (SELECTION) switch and then select the display language you wish to set (shown on the right side of the display) by pressing the **FF** (▲) or **LF** (▼) switch.
6. Press the **ON LINE** (SET) switch to set the desired selection.
7. Press the **FUNCTION** switch to exit the Function mode.

(10) PRINT SETTING Menu

This menu allows you to print the current settings and MACROs status. To print out the current settings, MACROs status and the FACTORY settings, follow these procedures:

Main Menu	Display	Function
PRINT SETTING	NOW PRINTING	Prints the current settings and MACRO status.

1. Install the paper (refer to Section 2.7 on page 2-9).
2. Verify that the ON LINE/FUNCTION indicator is blinking. (If not, press the **FUNCTION** switch.)
3. Press the **SUPER QUIET** (MENU) switch to enter the main Menu.
4. Press the **SUPER QUIET** (MENU) switch until the display shows "PRINT SETTING". You can also scroll the menu by pressing the **FF** (▲) or **LF** (▼) switch.
5. Press the **ON LINE** (SET) switch. The printer will start printing.
6. After printing is finished, press the **FUNCTION** switch to exit the Function mode.

3.3 Detectors

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Paper Out detector

The Paper Out detector is located under the platen and senses the absence of paper. When an out of paper condition occurs, printing stops, the printer goes to the OFF LINE mode, the alarm sounds and the Paper Out light starts blinking. You will also find that the display shows "PAPER OUT". To continue printing to the end of the current page when an out of paper condition occurs, press the ON LINE switch repeatedly until the page is completed. In this case, the paper will not feed correctly and printout result may not be correct. To start printing the next page, install new paper and press the ON LINE switch. The printer will resume printing.

Note:

- The Paper Out detector can be disabled through the Function mode.

Overheat detector

If the printer is printing continuously for extended periods of time, the printhead may become overheated. When this occurs, an internal protective circuit will cause the printer to pause and the display will show "PRINthead HOT" until the head temperature decreases sufficiently, at which time the printer will automatically resume printing without loss of data. This feature is included to extend the life of the printhead.

Cover open detector

When the smoked plastic cover is opened, the printer detects it and goes to the OFF LINE mode after printing to the end of the current line. At the same time a beep sounds five times and the printhead moves to the ribbon exchange area, the display will show "COVER OPEN" and "OFF LINE" alternately. When the ON LINE switch is pressed after closing the cover, the printhead moves to the far left, stops to check for a paper jam, and then the printer will resume printing.

3.4 Initialization

The printer is initialized under the following conditions:

- the AC power is turned on
- the PRIME signal is received
- the RESET PRINTER command is received

When the printer is initialized, the following conditions are set:

- the print buffer is cleared
- the receive buffer is cleared (not cleared by RESET PRINTER command)
- the download character buffer is cleared (not cleared by PRIME signal in IBM Proprinter XL24E mode or by RESET PRINTER command)
- horizontal tabs are set every 8 columns
- vertical tab settings are cleared
- all modes set by control and escape commands will be cleared
- present form position is designated as top of form
- the Self Test mode is cleared
- the Function mode settings are read and set
- Control Panel settings are not changed by PRIME signal or RESET PRINTER command*
- the printhead goes to the home position

* Some software packages send PRIME signal at the beginning of their programs. Print modes set by the Function mode will not change.

Receive Buffer Clear Function

This function allows you to clear the receive buffer (information recently sent from the computer and is currently printing) without changing the Function mode settings. This feature is very useful when you find some mistakes while printing.

1. Press the **ON LINE** switch to stop the printing and enter the OFF LINE mode.
2. Press the **LF** switch **while** pressing the **FUNCTION** switch to clear the data in the receive buffer.
3. Press the **ON LINE** switch to enter the ON LINE mode.

3.5 Hex Dump

In this mode, all data received from the computer is printed in hex code instead of the normal ASCII characters. Function codes for the printer (CR, LF, HT, etc.) are not executed. This mode is very useful to debug programs.

To enter the Hex Dump mode:

Turn the power on while pressing both **FF** and **LF** switches. The display shows "HEX DUMP MODE".

To release the Hex Dump mode:

Turn the power off, then back on.

4. Software Introduction

4.1 Introduction

In order for a computer to communicate with a printer, both pieces of equipment must understand a common language or coding scheme. One such coding scheme is called ASCII (American Standard Code for Information Interchange). For example, the ASCII code can express the character “K” in any of the following forms:

(01001011)₂—Binary
4B_{HEX}, 4B_H—Hexadecimal
75_{DEC}, 75_D—Decimal

Many computers allow you to enter ASCII codes in either hexadecimal or decimal form. The entered ASCII codes are converted to binary form by the computer and then sent to the printer.

In the following sections, you will see how to enter various ASCII codes to enable the printer to perform the functions you would like. Since the decimal equivalent of the ASCII code is most commonly used, all examples which follow will use the decimal form.

Appendix A contains the ASCII characters and control command tables used by this printer.

4.2 Control Codes

The various printer functions are set through the use of control codes, which consist of one or more ASCII characters entered into the computer in a special way. These control codes often differ from printer to printer. Control codes generally fall into two categories: one-byte control codes and multi-byte control codes. The multi-byte control codes are often referred to as Escape Sequences since each code begins with the ASCII code for the ESCAPE character (ESC). Such an ESC character should not be confused with the Escape Key found on some computer keyboards.

Control codes can be sent to this printer from your computer in different ways. The three most common ways are:

Software Introduction

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- Through commercial software packages
- Directly from the keyboard
- From within a user written program

The latter two methods will specifically refer to the BASIC language, although other languages such as FORTRAN, PASCAL, etc., can also be used. We will use BASIC since it is a relatively easy language to use. In addition, it is one of the most commonly used microcomputer languages.

4.3 Entering Control Codes through Commercial Software Packages

Many computer users do not have the time, the expertise, or the interest to develop software suited for their applications. In such cases software written by professionals can be purchased. Such software should be selected not only to meet the needs of the user, but must also be compatible with both computer and printer.

Commercial software is often written with what is called a driver. A driver is that part of the software which allows the user to configure the package to the type of printer (based on emulation or compatibility setting) and interface being used. Once the software has been booted, the user is generally requested to supply additional information such as:

- Brand/Model/Emulation mode of printer being used.
- I/O port being used. (eg: LPT1:, if a parallel interface is being used.)
- Baud rate, parity, etc. if a serial interface is being used.

But how do you know which mode to choose? The major factor to consider is which printer your software supports. Most commercial software packages include printer drivers that support one or more of the printers that this printer can emulate.

The installation program usually offers a menu of printers from which to choose. If you find this printer on the menu, select it.

1.

Choices in order of priority: (If you set the EMULATION menu to EPSON through the Function mode.)

We recommended that you inspect your software first. If it offers a menu of supported printers, select the printer mode in this order of preference:

- a. Panasonic KX-P2624
- b. Panasonic KX-P1654
- c. Panasonic KX-P1624
- d. Epson LQ-1050
- e. Epson LQ Series

2.

Choices in order of priority (IBM mode)

- a. IBM Proprinter XL24E

Once the necessary information has been supplied, the software will provide the computer with the control codes and other data needed by this printer.

Many word processing packages will request that you enter the ASCII codes used by this printer for special settings such as underlining, compressed print, super- and subscript, italics, etc. In all cases you should refer to your software instruction manual for the proper use of the package with this printer.

4.4 Entering Control Codes Directly from the Keyboard

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With many computers, the BASIC language is ready to use once you power up. With others, BASIC must be loaded into memory. In any case, once BASIC is ready, you may then enter these printer control commands directly from your computer keyboard.

BASIC requires the use of the PRINT command (or LPRINT, PRINT#, etc. depending on the type of BASIC your computer uses) to process and send the control commands to this printer. As part of this print command, you must supply the appropriate ASCII code(s) for the character string (CHR\$) function.

For example, the command: **LPRINT CHR\$(15)** (decimal code 15) followed by a **RETURN** will set this printer to compressed mode. Subsequent output to this printer will appear in compressed mode.

If, after issuing the above command, subsequent PRINT statements output nothing to the printer, check for one or more of the following:

- Have you indicated to the computer that output is to the printer and not the screen? For example, **PR#1**, causes subsequent PRINT statements on the Apple computer to PRINT to the printer and not to the screen. LPRINT does the same in Microsoft BASIC.
- Is this printer on line? If not, press the green ON LINE switch on the front panel.
- Is the interface cable plugged into the computer and printer?
- When using a serial interface, is the baud rate setting on the printer the same as that on the computer or interface card?

Notice that when you enter a BASIC command directly from the keyboard, you do NOT use a line number as you would in a BASIC program. Moreover, control codes may be entered only one line at a time.

4.5 Entering Control Codes from Within a Basic Program

Control codes may also be entered from within a BASIC program. The advantage to this technique is that you can incorporate a number of different control commands into a single program and therefore produce output with a variety of special features. This is done by RUNning your program once. In this case BASIC requires that each line in your program be preceded by a line number.

As an example, we mentioned earlier that the command **LPRINT CHR\$(15)** entered directly from the keyboard will set compressed print on this printer. From within a BASIC program, this command might be:

```
50 LPRINT CHR$(15)
```

4.6 Entering Hexadecimal Code

In the event that you will be entering ASCII codes in hexadecimal form, you must supply two extra characters per code. These are the ampersand (&) and the letter H. The example below illustrates the BASIC command to set compressed print on this printer.

Decimal
LPRINT CHR\$(15)

Hexadecimal
LPRINT CHR\$(&H0F)

Refer to Appendix A.

4.7 Control Codes

A number of the printer control commands require only a single ASCII-coded character as part of the LPRINT statement. The command LPRINT CHR\$(15) which we discussed earlier is an example of a single-byte control command.

Multi-byte control codes, often called Escape control codes or Escape sequences, always begin with an ESC designation. ESC is designated by CHR\$(27) in decimal form or CHR\$(&H1B) in hexadecimal form. The ESC designation is always followed by one or more additional codes, hence the name multi-byte control code.

In BASIC, these two or more bytes are joined (or concatenated) into a single command or string using either a plus (+) sign, a semicolon(;), or by neither symbol but rather by listing one byte after another without any spaces. Refer to your BASIC manual for the proper method of string concatenation.

Table 4.1 and 4.2 on the following page, show equivalent methods of entering multi-byte control commands for most computers.

There is one remaining input format commonly used to reduce the keystrokes necessary to enter a multi-byte control command. As you examine the multi-byte control commands in the pages ahead, you will notice that the second byte, with the exception of ESC+SO and ESC+SI, is always a character which appears somewhere on your keyboard. In such cases rather than enter that character's ASCII code as part of the CHR\$ function, you may simply enter that character in quotes (""). For example, to set pica pitch (ESC+"P"), you may enter:

```
LPRINT CHR$(27)+"P"; or LPRINT CHR$(27)+CHR$(80);
```

As another example, to set double width printing, you may enter:

```
LPRINT CHR$(27)+"W"+CHR$(1);  
or  
LPRINT CHR$(27)+CHR$(87)+CHR$(1);
```

With this method, any of the three input formats shown in Table 4.1 and 4.2 may also be used (subject to the BASIC you are using).

	Two-Byte Command
Function Name Code	Set Pica Pitch ESC+“P” 27, 80 _{DEC}
Input Format 1 Input Format 2 Input Format 3	LPRINT CHR\$(27)+“P”; LPRINT CHR\$(27);“P”; LPRINT CHR\$(27)“P”;

Table 4.1 Two-Byte Command Input Format

	Three-Byte Command
Function Name Code	Set Double Wide Printing ESC+“W”+1 27, 87, 1 _{DEC}
Input Format 1 Input Format 2 Input Format 3	LPRINT CHR\$(27)+“W”+CHR\$(1); LPRINT CHR\$(27);“W”;CHR\$(1); LPRINT CHR\$(27)“W”CHR\$(1);

Table 4.2 Three-Byte Command Input Format

This printer has two printer (emulation) modes. They are Epson LQ-1050 and IBM Proprinter XL24E. Software commands for each mode are covered in the corresponding chapters.

4.8 Special Code for IBM PC or Compatible Computers

Since the LPRINT command on IBM PC or compatible computer can generate an unexpected Line Feed (LF) and/or Carriage Return (CR), use PRINT #1 instead of LPRINT. For details refer to your BASIC manual. The following two lines of BASIC are necessary at the top of the program.

```
10 WIDTH "LPT1:", 255
20 OPEN "LPT1:" AS #1
```

The following line of BASIC is necessary at the end of the program:

```
100 CLOSE
```

(line # will vary accordingly to your program)

PRINT #1 does not generate CR and LF, therefore a CR and LF must be used when they are required.

5. KX-P2624 Features

5.1 Print Feature Controls

This printer has a wide variety of print capabilities as shown below. The user can select any print mode by combining quality, font, font style, pitch and highlight, giving you more than 172,000 different print styles to customize the look of your particular document.

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Quality	Font	Font Style	Pitch	Highlight
Draft	Draft	Subscript	10	Double high
LQ	Courier	Superscript	12	Double wide
SLQ	Prestige	Italic	15*	Bold (Emphasize)
	Bold PS		17	Double strike
	Script		20*	Outline
	Sans Serif		PS	Shadow
	Orator			Underline
	Roman			Overline

* Available in IBM Proprinter XL24E mode only through the EZ Set Operator Panel.

Print Quality and Font

This printer has three print quality levels: Draft, LQ (Letter Quality) and SLQ (Super Letter Quality). Which you choose depends on your needs. Draft is printed at the fastest speed and is normally used for printing draft documents. LQ produces the high print quality and SLQ produces much better print quality than LQ; they are used to print the final version of formal documents.

The printer has seven LQ fonts: Courier, Prestige, Bold PS, Script, Sans Serif, Orator and Roman; three Draft fonts: Pica, Elite and Micron; and one SLQ font. These can be selected either by setting it on the EZ Set Operator Panel or through software.

Sub/superscript font characters are two-thirds the height of normal characters and are typically used in mathematical expressions, chemical formulae and footnotes.

Character Pitch

This printer has ten character pitches: 10 cpi (Pica), 12 cpi (Elite), 15 cpi (Micron), 17 cpi (Compressed), 20 cpi (Elite compressed), 5 cpi (Pica elongated), 6 cpi (Elite elongated), 7.5 cpi (Micron elongated), 8.5 cpi (Compressed elongated) and Proportional Spacing.

The height of the characters in the different pitches is the same; only the width varies. The pitches except PS are fixed pitch (within a pitch, all characters have the same width).

In proportional spacing, character widths vary with the character. An "I", for example, takes up less space than an "M" or a "W".

Proportional printing gives the document a typeset appearance. **Proportional spacing cannot be printed in draft mode.**

(Print Example)

```
5 cpi printing  
  (Pica elongated)  
6 cpi printing  
  (Elite elongated)  
7.5 cpi printing  
  (Micron elongated)  
8.5 cpi printing  
  (Compressed elongated)  
10 cpi printing (Pica)  
12 cpi printing (Elite)  
15 cpi printing (Micron)  
17 cpi printing (Compressed)  
20 cpi printing (Elite Compressed)  
Proportional Spacing
```

KX-P2624 Features

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Character Highlighting

This printer allows a document to have a variety of print styles through the Function mode or the software commands.

Double high printing makes the height of a character twice that of a normal one.

Double wide printing makes the width of a character twice that of a normal one.

Double strike printing uses a double strike with two passes of the printhead.

Bold (Emphasized) printing is done with one pass of the printhead at half speed, which allows horizontally adjacent dots to be printed.

Outline printing makes the outline character of a normal one.

Shadow printing makes the shadow character of a normal one.

Underline printing produces a continuous line under characters, using the 24th pin of the printhead.

Overline printing produces a continuous line over characters using the first pin of the printhead.

(Print Example)

Double High
Double Wide
Double Strike Printing
Emphasized Printing
Outline printing
Shadow printing
Underline Overline Printing

5.2 Download Characters

Should you need to custom design special characters in addition to those provided, the 32K byte buffer option (KX-P43), is required. Draft and Letter Quality (LQ) fonts can be downloaded simultaneously. Draft download characters are printed when the printer is in draft mode. LQ characters are printed when the printer is in LQ mode.

To Download a character, you must first make preparations for:

- Installing the 32K buffer option (KX-P43).
- OPT RAM in the INSTALL menu is selected to DOWNLOAD through the Function mode (see page 3-27).

Making Maximum Use of the Buffer

Epson LQ-1050 mode

18K (18,432) bytes are available which can be divided between draft and LQ characters in any combination, subject to hexadecimal address and buffer limits. Draft letters require 39 bytes maximum each while LQ letters require 114 maximum. To determine if the desired combination will fit, use the formula:

$$(\# \text{ of draft characters} \times 39) + (\# \text{ of LQ characters} \times 114) \leq 18,432$$

For example:

120 draft and 120 LQ are desired.

$$(120 \times 39) + (120 \times 114) = 4,680 + 13,680 = 18,360$$

therefore this combination will fit.

Because no more than 256 addresses can be identified in 1 byte (00_{HEX}–FF_{HEX}). 256 is the maximum number of draft characters that can be defined. The maximum number of LQ characters that can be loaded is 161.

IBM Proprinter XL24E mode

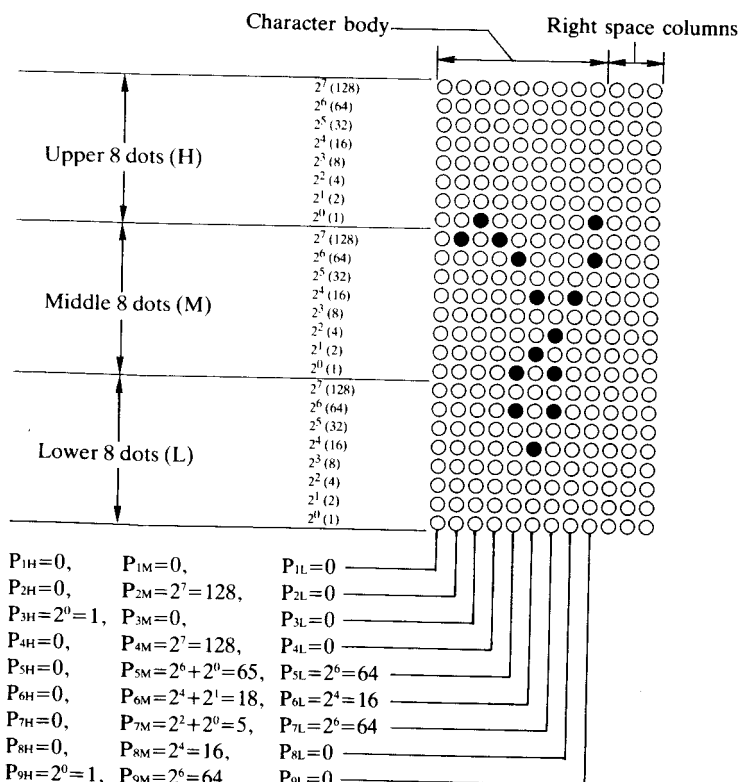
The 32K bytes available can be divided between draft and LQ characters in any combination. The download data also can be entered to RAM by compression. The maximum number of characters depends on the manner in which the characters are entered.

Designing Download Characters

1. Draft Font

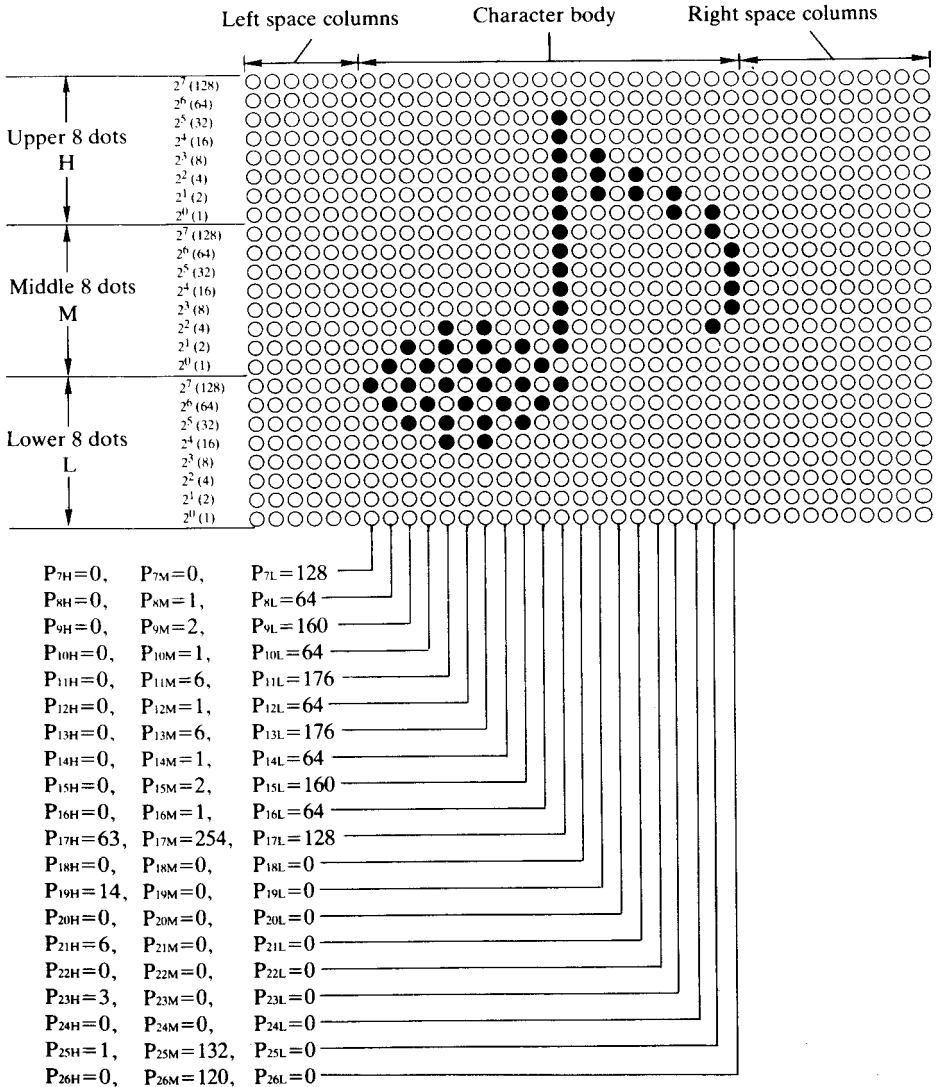
To download a character you must first design the character. A draft font download character uses 9 columns and 24 rows of dots. Since a given column contains 24 dots, each column is divided into 3 portions, upper 8, middle 8 and lower 8 dots. Column 1 is labeled P_{1H} for the upper 8 dots, P_{1M} for the middle 8 and P_{1L} for the lower 8 dots. Similarly column 9 is labeled P_{9H} for the upper 8 dots, P_{9M} for the middle 8 and P_{9L} for the lower 8 dots. Columns 10, 11 and 12 are always set to zero, thus we are working with P_{1H} through P_{9L} .

In the matrix below, the circles represent pins which may be fired. You may darken any circle provided no two adjacent horizontal circles are filled in. Once you have designed the character, you must quantify each dot column, P_{1H} – P_{9H} , by summing the powers of two represented by each dot. Consider the design of the Greek character gamma.



2. LQ Font

A LQ font download character uses 36 columns and 24 rows of dots. Designing and storing fonts can be performed in the same way as with draft fonts. Here, consider the design of the one-eighth-note character:



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Entering Download Data

Epson LQ-1050 mode

1. Draft Font

Download command in the Epson LQ-1050 mode is:

ESC+"&" + 0 + n + m + d₀ + d₁ + d₂ + DATA

5

Input format for a download command is:

LPRINT CHR\$(27)+"&" + CHR\$(0) + CHR\$(n) + CHR\$(m)
+ CHR\$(d₀) + CHR\$(d₁) + CHR\$(d₂) + DATA

Programming example for the Greek character gamma is as follows:

```
10 REM Draft Download Character
20 WIDTH "LPT1:",255
30 OPEN "LPT1:" AS #1
40 PRINT #1,CHR$(27)+"x0";
50 PRINT #1,CHR$(27)+"":CHR$(0)+CHR$(0)+CHR$(0);
60 PRINT #1,CHR$(27)+"&"+CHR$(0)+CHR$(65)+CHR$(65);
70 PRINT #1,CHR$(1)+CHR$(8)+CHR$(3);
80 PRINT #1,CHR$(0)+CHR$(128)+CHR$(0);
90 PRINT #1,CHR$(1)+CHR$(0)+CHR$(0);
100 PRINT #1,CHR$(0)+CHR$(128)+CHR$(0);
110 PRINT #1,CHR$(0)+CHR$(65)+CHR$(64);
120 PRINT #1,CHR$(0)+CHR$(18)+CHR$(16);
130 PRINT #1,CHR$(0)+CHR$(5)+CHR$(64);
140 PRINT #1,CHR$(0)+CHR$(16)+CHR$(0);
150 PRINT #1,CHR$(1)+CHR$(64)+CHR$(0);
160 REM Download character print
170 PRINT #1,CHR$(27)+"%" + CHR$(1);
180 PRINT #1,"A A A A A A A A A ";CHR$(10);
190 PRINT #1,CHR$(27)+"%" + CHR$(0);
200 END
```

First determine where in RAM the character(s) should be stored. The variables "n" and "m" are used for this purpose. The value specified for n indicates the location into which the first download character will be stored. The value specified for "m" indicates the location into which the last download character will be stored. If you are storing a single character, then n=m.

Next define the value of "d₀", "d₁" and "d₂" which specify attribute information. The attribute information includes the following:

d₀=number of space dot columns to the left of the character body

d₁=number of character body dot columns

d₂=number of space dot columns to the right of the character body

In our sample program, we created a gamma character. This character consists of 1 left space dot column, 8 body dot columns and 3 right space dot columns. Therefore, $d_0=1$, $d_1=8$ and $d_2=3$.

In general, d_1 cannot exceed 9 and $d_0+d_1+d_2$ cannot exceed 12.

Note:

- Program line 40 is necessary for downloading draft font and designates draft printing.
- Program lines 80~150 use the eight values $P_{2H} \sim P_{9L}$ to define the shape and size of the gamma.
- Program line 170 selects download character generator. After this selection, by printing the download code [in this example, $CHRS(65) = "A"$] the downloaded character is printed.
- Two horizontal adjacent columns cannot be printed in either draft or LQ mode.

2. LQ Font

Input format is the same as with draft fonts.

Programming example for the one-eighth-note character is as follows:

```

10 REM Define Download Letter Quality Character
20 WIDTH "LPT1:",255
30 OPEN "LPT1:" AS #1
40 PRINT #1,CHR$(27)+"x1";
50 PRINT #1,CHR$(27)+": "+CHR$(0)+CHR$(0)+CHR$(0);
60 PRINT #1,CHR$(27)+"&"+CHR$(0)+CHR$(65)+CHR$(65);
70 PRINT #1,CHR$(6)+CHR$(20)+CHR$(10);
80 PRINT #1,CHR$(0)+CHR$(0)+CHR$(128);
90 PRINT #1,CHR$(0)+CHR$(1)+CHR$(64);
100 PRINT #1,CHR$(0)+CHR$(2)+CHR$(160);
110 PRINT #1,CHR$(0)+CHR$(1)+CHR$(64);
120 PRINT #1,CHR$(0)+CHR$(6)+CHR$(176);
130 PRINT #1,CHR$(0)+CHR$(1)+CHR$(64);
140 PRINT #1,CHR$(0)+CHR$(6)+CHR$(176);
150 PRINT #1,CHR$(0)+CHR$(1)+CHR$(64);
160 PRINT #1,CHR$(0)+CHR$(2)+CHR$(160);
170 PRINT #1,CHR$(0)+CHR$(1)+CHR$(64);
180 PRINT #1,CHR$(63)+CHR$(254)+CHR$(128);
190 PRINT #1,CHR$(0)+CHR$(0)+CHR$(0);
200 PRINT #1,CHR$(14)+CHR$(0)+CHR$(0);
210 PRINT #1,CHR$(0)+CHR$(0)+CHR$(0);
220 PRINT #1,CHR$(6)+CHR$(0)+CHR$(0);
230 PRINT #1,CHR$(0)+CHR$(0)+CHR$(0);
240 PRINT #1,CHR$(3)+CHR$(0)+CHR$(0);
250 PRINT #1,CHR$(0)+CHR$(0)+CHR$(0);
260 PRINT #1,CHR$(1)+CHR$(132)+CHR$(0);
270 PRINT #1,CHR$(0)+CHR$(120)+CHR$(0);
280 REM Download character print
290 PRINT #1,CHR$(27)+"%"+CHR$(1);
300 PRINT #1,"A A A A A A A A ";CHR$(10);
310 PRINT #1,CHR$(27)+"%"+CHR$(0);
320 END

```

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The number of printable columns for characters downloaded in the letter quality font is as follows:

	$d_0 + d_1 + d_2$
LQ 10 cpi	36
LQ 12 cpi	30
Proportional Spacing	42

5

Print Mode Combination:

- Draft Download characters can be printed only when the FONT is set to Draft through the Function mode or through software commands.
- Letter quality download characters can be printed only when the FONT is set to Bold PS, Courier, Orator, Prestige, Roman, Sans Serif, Script through the Function mode or through software commands.

IBM Proprinter XL24E mode

Downloading fonts in IBM Proprinter XL24E mode requires downloading character Dot Pattern data and character Index Table data. Dot pattern data controls which pins fire when printing a character, Index Table data is placed in a “lookup table” that provides information on where Dot Pattern data is stored in memory and defines certain attributes of the character.

The format for the command to input download data is:

ESC+“=”+ $n_1 + n_2 + 35 + A_1 + A_2 + d_1 + d_2 + \dots + d_x$

where

$n_1 + (256 \times n_2)$ = the number of data bytes to be downloaded, 35 is a fixed number that must always be sent, A_1 and A_2 indicate the low order and high order addresses in which data is to be stored, and d_1, d_2, \dots is the data being downloaded. This data will be in one of two formats, depending on whether it is Dot Pattern or Index Table:

Index Table Addresses

Starting memory addresses for Index Tables are:

Draft (10 and 12 cpi)	8011 _{HEX}
LQ 10 cpi	8912 _{HEX}
LQ Proportional	9213 _{HEX}
LQ 12 cpi	9B14 _{HEX}

To calculate the address for an individual character Index Table Entry, use the equation:

Address = $9 \times \text{ASCII character number} + \text{starting address}$.

To find the address of the Index Table location for the draft letter "A":

Multiply 9×65 (ASCII character number for "A") = 585_{DEC}

Convert to hexadecimal = 249_{HEX}

Add starting address for draft = 8011_{HEX}

yielding $825A_{\text{HEX}}$ making $A_1 = 5A_{\text{HEX}}$, and $A_2 = 82_{\text{HEX}}$.

Dot Pattern Data

Dot Pattern data is sent for all columns that must be uniquely defined. If adjacent horizontal columns are identical (or can be made identical knowing that the printer will not print adjacent horizontal dots) data compression may be used and the duplicate data need not be sent. Dot Pattern data may be stored at any address from $A414_{\text{HEX}}$ to $FFFF_{\text{HEX}}$ inclusive.

Dot columns for characters are as follows:

Draft (10 and 12 cpi) 10 columns

LQ 10 cpi 36 columns

LQ 12 cpi 30 columns

LQ Proportional 18~42 columns

It is important to note that the last column is always blank. (e.g. A download draft character is defined by 9 columns. The printer automatically adds the tenth column.)

$\text{Data} = P_{1H} + P_{1M} + P_{1L} + P_{2H} + P_{2M} + P_{2L} + \dots + P_{nH} + P_{nM} + P_{nL}$

Index Table Data

$AA_1 + AA_2 + IT_1 + IT_2 + CM_1 + \dots + CM_5$

where

AA_1 and AA_2 indicate the address where Dot Pattern data is stored.

AA_1 and AA_2 are the high order and the low order bytes respectively.

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IT₁ is Index Table byte #1. Bit designation is:

Bit	0	1
7	Normal Character	Graphic Character
6	Download Character	Resident Character
5~0	Number of columns in the character memory	

IT₂ is Index Table byte #2. Bit designation is:

Bits 7, 6 Type of block graphic character
00 shading character
01 line drawing character
10 underscore character
11 not supported

Bits 5~0 number of columns in the character less 1
[e.g. for draft characters, $10 - 1 = 9_{\text{DEC}} = (001001)_2$
bits 5~0=001001]

CM₁~CM₅ are compression mask bits. (0=no compression, 1=compression)

CM₁ bit 7=1st dot column
bit 6=2nd dot column

.

.

.

CM₅ bit 3=37th dot column
bit 2=38th dot column
bit 1=39th dot column
bit 0=40th dot column

Note:

- All block graphic characters are 30 dots high, even though only 24 dots are defined for each column. An underline is defined as a blank block graphic character (all zeros). The underline is generated by the printer during the second pass. A shadow character repeats dots 1~6 of each column as dots 25 through 30 respectively. A line draw character repeats dots 23 and 24 as the pairs 25 and 26, 27 and 28, and 29 and 30.
- Entry data can designate any character data image whether resident or downloaded. Multiple table entries can designate the same character. The address of an undefined entry should be 000. An undefined entry is printed as a space.
- Location 0 (00_{HEX}) normally stores the slashed zero. If a character is downloaded into this location, when the slashed zero is selected through the Function mode, the downloaded character will print in place of any zero.

Data Compression

Data Compression allows the efficient use of memory in storing downloaded characters providing space for more characters than would be available without compression. The printer repeats the previous dot column in the current column when the current column compression mask bit is set to 1.

Resetting Download Area

Issuing the command ESC+“=”+0+0 initializes the download area. All previously downloaded characters are cleared and the Index Tables are loaded with information for resident fonts.

KX-P2624 Features

Programming Examples:

To load the draft character used in the example for the Epson LQ-1050 mode (Greek gamma), the following program may be used.

```
10 REM Greek Gamma Character Download and print
20 WIDTH "LPT1:",255
30 OPEN "LPT1:" AS #1
40 REM---(Initialize the Download Buffer)
50 PRINT #1,CHR$(27)+"="+CHR$(0)+CHR$(0);
60 REM---(Dot Pattern Data Entry to ASCII "A")
70 PRINT #1,CHR$(27)+"="+CHR$(30)+CHR$(0)+CHR$(35);
80 PRINT #1,CHR$(&H0)+CHR$(&HB0);
90 PRINT #1, CHR$(0)+CHR$(128)+CHR$(0);
100 PRINT #1,CHR$(1)+CHR$(0)+CHR$(0);
110 PRINT #1,CHR$(0)+CHR$(128)+CHR$(0);
120 PRINT #1,CHR$(0)+CHR$(65)+CHR$(64);
130 PRINT #1,CHR$(0)+CHR$(18)+CHR$(16);
140 PRINT #1,CHR$(0)+CHR$(5)+CHR$(64);
150 PRINT #1,CHR$(0)+CHR$(16)+CHR$(0);
160 PRINT #1,CHR$(1)+CHR$(64)+CHR$(0);
170 PRINT #1,CHR$(0)+CHR$(0)+CHR$(0);
180 REM---(Index Table Entry to ASCII "A" )
190 PRINT #1,CHR$(27)+"="+CHR$(12)+CHR$(0)+CHR$(35);
200 PRINT #1,CHR$(&H5A)+CHR$(&H82);
210 PRINT #1,CHR$(&HB0)+CHR$(&H0)+CHR$(8);
220 PRINT #1,CHR$(10)+CHR$(0)+CHR$(0);
230 PRINT #1,CHR$(0)+CHR$(0)+CHR$(0);
240 REM---(Download Character print )
250 PRINT #1,CHR$(27)+"I"+CHR$(4);
260 FOR I=1 TO 10
270 PRINT #1, "A";
280 NEXT
290 PRINT #1,CHR$(13);CHR$(10);
300 CLOSE #1
310 END
```

In this example of Greek gamma, a character is not compressed and data of CM₁ through CM₅ are all zeros.

To load the LQ character used in the example for the one-eighth-note character, the following program may be used.

Input format is the same as with draft fonts.

Programming example for the one-eighth-note character is as follows:

```
10 REM One-eight-note Character Download and print
20 WIDTH "LPT1:",255
30 OPEN "LPT1:" AS #1
40 REM---(Initialize the Download Buffer)
50 PRINT #1,CHR$(27)+"="+CHR$(0)+CHR$(0);
60 REM---(Dot Pattern Data Entry to ASCII "B")
70 PRINT #1,CHR$(27)+"="+CHR$(45)+CHR$(0)+CHR$(35);
80 PRINT #1,CHR$(&H0)+CHR$(&HB0);
90 PRINT #1, CHR$(0)+CHR$(0)+CHR$(0);
100 PRINT #1,CHR$(0)+CHR$(0)+CHR$(128);
110 PRINT #1,CHR$(0)+CHR$(1)+CHR$(64);
120 PRINT #1,CHR$(0)+CHR$(3)+CHR$(224);
130 PRINT #1,CHR$(0)+CHR$(7)+CHR$(240);
140 PRINT #1,CHR$(0)+CHR$(3)+CHR$(224);
150 PRINT #1,CHR$(0)+CHR$(1)+CHR$(64);
160 PRINT #1,CHR$(63)+CHR$(254)+CHR$(128);
170 PRINT #1,CHR$(14)+CHR$(0)+CHR$(0);
180 PRINT #1,CHR$(6)+CHR$(0)+CHR$(0);
190 PRINT #1,CHR$(3)+CHR$(0)+CHR$(0);
200 PRINT #1,CHR$(1)+CHR$(132)+CHR$(0);
210 PRINT #1,CHR$(0)+CHR$(120)+CHR$(0);
220 PRINT #1,CHR$(0)+CHR$(0)+CHR$(0);
230 REM---(Index Table Entry to ASCII "B" )
240 PRINT #1,CHR$(27)+"="+CHR$(12)+CHR$(0)+CHR$(35);
250 PRINT #1,CHR$(&H64)+CHR$(&HB);
260 PRINT #1,CHR$(&HB0)+CHR$(&H0)+CHR$(14);
270 PRINT #1,CHR$(35)+CHR$(124)+CHR$(90);
280 PRINT #1,CHR$(85)+CHR$(47)+CHR$(240);
290 REM---(Download Character print )
300 PRINT #1,CHR$(27);"I";CHR$(6);
310 FOR I=1 TO 10
320 PRINT #1,"B";
330 NEXT
340 PRINT #1,CHR$(13);CHR$(10);
350 CLOSE #1
360 END
```

Note:

- The left most column of adjacent identical columns has its compression mask bit set to 0 and that bit in the other columns is set to 1.
- Entry data can designate any character data image whether resident or downloaded. Multiple table entries can designate the same character. The address of an undefined entry should be 000. An undefined entry is printed as a space.
- Location 0 (00_{HEX}) normally stores the slashed zero. If a character is downloaded into this location, when the slashed zero is selected through the Function mode, the downloaded character will print in place of any zero.
- ASCII character in location 255 (FF_{HEX}) cannot be defined.

5.3 Bit Image (Graphics)

Bit image (Graphics) is used to produce pictures, graphs, charts or creative patterns. Many commercial software packages use bit images. This printer has six 8-pin bit image modes and five 24-pin bit image modes within LQ-1050 mode, and has four 8-pin/24-pin bit image modes within IBM Proprinter XL24E mode, so that you have a wide variety of image printing. When you use a commercial software package you should refer to your software instruction manual for the proper use of it with this printer. Each printer mode has its own bit image commands. Because differences between the two modes are few, only LQ-1050 mode is used here as an example of how to print bit images through software commands.

Dot Density

Dot density (dot resolution) refers to the maximum number of dots which can be printed in an inch or on a line. This printer enables you to access a variety of dot densities through specific control commands. The various dot densities and corresponding control commands appear in Table 5.1.

Command	Function	Dots/Inch	Dots/line
ESC+"K"+n ₁ +n ₂	Standard density	60	816
ESC+"L"+n ₁ +n ₂	Double density	120	1632
ESC+"Y"+n ₁ +n ₂	Double speed, Double density	120	1632
ESC+"Z"+n ₁ +n ₂	Quadruple density	240	3264
ESC+"*" + m + n ₁ + n ₂	8-Pin Mode Selection:		
	m=0 (Standard)	60	816
	m=1 (Double)	120	1632
	m=2 (Double speed, Double density)	120	1632
	m=3 (Quadruple density)	240	3264
	m=4 (CRT I)	80	1088
	m=6 (CRT II)	90	1224
	24-Pin Mode Selection:		
	m=32 (Standard)	60	816
	m=33 (Double)	120	1632
	m=38 (CRT III)	90	1224
	m=39 (Triple)	180	2448
	m=40 (Hex)	360	4896
ESC+"["+"g"+n ₁ +n ₂ +m	8-Pin Mode Selection:		
	m=0 (Standard)	60	816
	m=1 (Double)	120	1632
	m=2 (Double speed, Double density)	120	1632
	m=3 (Quadruple density)	240	3264
	24-pin Mode Selection:		
	m=8 (Standard)	60	816
	m=9 (Double)	120	1632
	m=11 (Triple)	180	2448
	m=12 (Hex)	360	4896

Table 5.1 Dot Density

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8-Pin Bit Image Mode

This printer has 24 pins in the printhead. The distance between the centers of adjacent pins is $\frac{1}{180}$ " (0.14 mm) and the diameter of each pin is $\frac{1}{127}$ " (0.2 mm). In 8-pin bit image mode the 24 pins of the printhead are grouped as follows. One byte is sent to the printer for each column to be printed. Each bit of that byte represents an individual pin-block. By summing the powers of two corresponding to each pin-block you wish to fire, you will obtain a numerical value for the column in question. By sending a string of bytes, numerical values for each column on a line are input and processed. The result is one line of graphics.

5

Pin-block	Pin-block Code	Pins	Pin No.	Pin-block Code	Pin-block
1	$2^7=128$	●	1	$2^7=128$	1
		●	2		
		●	3		1 and 2
		●	4		
2	$2^6=64$	●	5	$2^6=64$	2
		●	6		
		●	7	$2^5=32$	3
		●	8		3 and 4
		●	9		
		●	10	$2^4=16$	4
3	$2^5=32$	●	11		
		●	12	$2^3=8$	5
		●	13		5 and 6
		●	14		
		●	15	$2^2=4$	6
		●	16		
4	$2^4=16$	●	17	$2^1=2$	7
		●	18		7 and 8
		●	19		
		●	20	$2^0=1$	8
		●	21		
		●	22		
		●	23		
		●	24		
5	$2^3=8$				
6	$2^2=4$				
7	$2^1=2$				
8	$2^0=1$				

LQ-1050 mode and
IBM Proprinter XL24E mode
(Alternate Graphic Mode: ON)

IBM Proprinter XL24E mode
(Alternate Graphic Mode: OFF)

Note:

- In the LQ-1050 mode or IBM Proprinter XL24E mode with Alternate Graphic Mode (AGM) set to ON through the Function mode, 8-pin bit image graphics is printed by using all 24 pins in the printhead.

As an example, suppose you want to fire pin-blocks 1, 2, 5 and 8 simultaneously. Then you compute the following sum:

$$\begin{aligned} \text{Input code} &= \text{Pin-block 1 code} + \text{Pin-block 2 code} + \\ &\quad \text{Pin-block 5 code} + \text{Pin-block 8 code} \\ &= 2^7 + 2^6 + 2^3 + 2^0 = 128 + 64 + 8 + 1 = 201 \end{aligned}$$

Thus, the value 201 is entered in the CHR\$ function in order to print a single column of dots resulting from firing pin-blocks 1, 2, 5 and 8.

For our final example, refer to the standard density designation in Table 5.1. This setting is given by ESC+“K”+n₁+n₂. To print image graphics, you must specify to the printer how many columns are to be used. This is done by finding values for n₁ and n₂, as follows:

Divide the total number of columns you select, by 256 (max # of columns). The result is n₁ and the remainder is n₂.

$$\begin{array}{r} 0 \text{ (n}_2\text{)} \\ 256 \overline{) 100} \\ \underline{0} \\ 100 \text{ (n}_1\text{)} \end{array} \quad \text{so, } n_2=0 \text{ and } n_1=100$$

Our control code ESC+“K”+n₁+n₂ now translates into:

LPRINT CHR\$(27)+“K”+CHR\$(100)+CHR\$(0);

When using IBM Proprinter XL24E mode, the values for n₁ and n₂ are computed as follows:

First, multiply the number of columns you select by the number of bytes. To select the number of bytes use the chart below:

- when m=0, 1, 2, 3: Bytes=1 (for m, refer to page 7-13)
- when m=8, 9, 11, 12: Bytes=3

For example, you select 100 columns and double density (or m=9, page 7-13), so your bytes are equal to 3. Now, use the following equation: 100 columns×3 bytes+1=301 (always add 1).

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Using the equation from above, we have:

$$\begin{array}{r} 1 \text{ (n}_2\text{)} \\ 256 \overline{) 301} \\ \underline{256} \\ 45 \text{ (n}_1\text{)} \end{array}$$

A programming example is as follows:

5

```

10 REM STANDARD DENSITY
20 WIDTH "LPT1:",255
30 OPEN "LPT1:" AS #1
40 PRINT #1,CHR$(27)+"3"+CHR$(24);
50 PRINT #1,CHR$(27)+"K"+CHR$(100)+CHR$(0);
60 FOR I=1 TO 5
70 PRINT #1,CHR$(1)+CHR$(2)+CHR$(4)+CHR$(8)+CHR$(16);
80 PRINT #1,CHR$(32)+CHR$(64)+CHR$(128)+CHR$(64)+CHR$(128);
90 PRINT #1,CHR$(64)+CHR$(128)+CHR$(64)+CHR$(128)+CHR$(64);
100 PRINT #1,CHR$(32)+CHR$(16)+CHR$(8)+CHR$(4)+CHR$(2);
110 NEXT I
120 PRINT #1,CHR$(13)+CHR$(10);
130 PRINT #1,CHR$(27)+"K"+CHR$(100)+CHR$(0);
140 FOR I=1 TO 5
150 PRINT #1,CHR$(128)+CHR$(64)+CHR$(32)+CHR$(16)+CHR$(8);
160 PRINT #1,CHR$(4)+CHR$(2)+CHR$(1)+CHR$(2)+CHR$(1);
170 PRINT #1,CHR$(2)+CHR$(1)+CHR$(2)+CHR$(1)+CHR$(2);
180 PRINT #1,CHR$(4)+CHR$(8)+CHR$(16)+CHR$(32)+CHR$(64);
190 NEXT I
200 PRINT #1,CHR$(13);CHR$(10);
210 CLOSE
220 END
    
```

24/180" Line space set



2nd line data

1st line data

Note:

- Line 20 and 30 are necessary for the proper execution of this program on many IBM-compatible computers.
- Line 40 is necessary to set the line feed for printing in the bit image mode. In the IBM Proprinter XL24E mode, when AGM is set to OFF through the Function mode, it will amount to 24/216 inch.

24-Pin Bit Image Mode

In the 24-pin bit image mode, all 24-pins of the printhead may be fired. In this mode, 3 data bytes must be sent to the printer for each column. The 24 pins in the printhead are divided into three portions, the upper 8 pins, middle 8 pins and lower 8 pins.

As an example, suppose you want to fire pins 1, 2, 5, 8, 9, 11, 12, 21 and 24 simultaneously. Then you compute the following three values:

Byte 1: Input code=Pin 1 code+Pin 2 code+Pin 5 code+Pin 8 code
 $=2^7+2^6+2^3+2^0=128+64+8+1=201$

Byte 2: Input code=Pin 9 code+Pin 11 code+Pin 12 code
 $=2^7+2^5+2^4=128+32+16=176$

Byte 3: Input code=Pin 21 code+Pin 24 code= $2^3+2^0=8+1=9$

Thus, the three bytes for a single column of dots are entered as CHR\$(201);CHR\$(176);CHR\$(9); Refer to the 24-pin standard density command in Table 5.1. This setting is given by ESC+“*”+m+n₁+n₂, where m=32. Suppose you wish to print 100 columns of dots, where every column fires pins 1, 2, 5, 8, 9, 11, 12, 21 and 24 as above.

As in the 8-pin example on page 5-19, n₁=100 and n₂=0. Our command ESC+“*”+m+n₁+n₂ now translates into

LPRINT CHR\$(27)+“*”+CHR\$(32)+CHR\$(100)+CHR\$(0);

If we incorporate this information into a program, we might have the following:

```
10 REM 24 PIN STANDARD DENSITY
20 WIDTH "LPT1:" ,255
30 OPEN "LPT1:" AS #1
40 PRINT #1,CHR$(27)+"*" +CHR$(32)+CHR$(100)+CHR$(0);
50 FOR I=1 TO 100
60 PRINT #1,CHR$(201);
70 PRINT #1,CHR$(176);
80 PRINT #1,CHR$(9);
90 NEXT I
100 PRINT #1,CHR$(10);
110 CLOSE
120 END
```



If in IBM mode AGM must be set to ON.

If you use ESC+“[”+“g”+n₁+n₂+m in IBM Proprinter XL24E mode, you must change line 40 as follows:

40 PRINT #1, CHR\$(27)+“[”+CHR\$(45)+CHR\$(1)+CHR\$(8);

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Note:

- Bit Image Graphics prints unidirectionally for high precision printing. For high speed printing set the printer to bidirectional printing through the Function mode (see page 3-19).
- Graphics mode is released immediately following the printing of all bit image data. Printing will return to text mode.
- Bit image data is not affected by MSB control commands.

Alternate Graphic Mode (AGM)

There are two kinds of graphic printing in IBM Proprinter XL24E mode. You can set them through Alternate Graphic Mode setting through the Function mode or software.

When AGM is set to OFF, 8-pin bit image graphic is printed by using pins 1 through 20.

When AGM is set to ON, the printing of 8-pin graphic mode is the same as in Epson LQ-1050 mode. Also, graphic printing command, ESC+“*” in Epson LQ-1050 mode is effective in this mode. Therefore, you can use the same command as in Epson LQ-1050 mode.

The following table shows commands affected by AGM mode.

		AGM ON	AGM OFF
ESC+“K”+n ₁ +n ₂ ESC+“L”+n ₁ +n ₂ ESC+“Y”+n ₁ +n ₂ ESC+“Z”+n ₁ +n ₂		use 24 pin	use 20 pin
ESC+“[”+ “g”+n ₁ +n ₂ +m	8-pin mode	use 24 pin	use 20 pin
	24-pin mode		use 24 pin
ESC+“3”+n ESC+“A”+n ESC+“J”+n		based on 1/180 inch based on 1/60 inch based on 1/180 inch	based on 1/216 inch based on 1/72 inch based on 1/216 inch

6. Epson LQ-1050 Mode Commands

This chapter covers the software commands when selecting the Epson LQ-1050 mode. The software commands are grouped into the following classifications:

FONT SELECTION

Name	Function	Page
ESC+“x”+n	Selects print quality	6-6
ESC+“k”+n	Selects print font style	6-6
ESC+“S”+1	Selects subscript printing	6-7
ESC+“S”+0	Selects superscript printing	6-7
ESC+“T”	Releases sub/superscript printing	6-7

CHARACTER PITCH SELECTION

Name	Function	Page
ESC+“P”	Sets pica pitch (10 cpi) printing	6-7
ESC+“M”	*Sets elite pitch (12 cpi) printing	6-8
ESC+“g”	Sets micron (15 cpi) printing	6-8
SI	*Sets compressed (17 cpi) printing	6-9
ESC+SI	*Sets compressed (17 cpi) printing	6-9
DC2	Releases compressed printing	6-9
ESC+“p”+1	Sets proportional spacing	6-9
ESC+“p”+0	Releases proportional spacing	6-9
ESC+“!”+n	Sets certain pitches based upon value of n	6-10

* When elite and compressed pitch are set simultaneously, subsequent output is printed in 20 cpi (up to 272 cpl).

CHARACTER HIGHLIGHT SELECTION

Name	Function	Page
ESC+“!”+n	Sets highlighting based upon value of n	6-10
ESC+“E”	Sets emphasized printing	6-10
ESC+“F”	Releases emphasized printing	6-10
ESC+“w”+1	Sets double high printing	6-11
ESC+“w”+0	Releases double high printing	6-11
DC4	Releases single-line double wide printing	6-11
SO	Sets single-line double wide printing	6-11
ESC+SO	Sets single-line double wide printing	6-11
ESC+“W”+1	Sets double wide printing	6-12
ESC+“W”+0	Releases double wide printing	6-12
ESC+“q”+n	Sets outline and shadow printing	6-12

Epson LQ-1050 Mode Commands

CHARACTER HIGHLIGHT SELECTION (continued)

Name	Function	Page
ESC+“G”	Sets double strike printing	6-13
ESC+“H”	Releases double strike printing	6-13
ESC+“-”+1	Sets underlining	6-13
ESC+“-”+0	Releases underlining	6-13
ESC+“(”+“-” +n ₁ +n ₂ +m +d ₁ +d ₂	Sets/releases score	6-14

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WORD PROCESSING MODE SELECTION

Name	Function	Page
ESC+“a”+0	Releases Word Processing mode	6-15
ESC+“a”+1	Selects centering mode	6-15
ESC+“a”+2	Selects right alignment mode	6-15
ESC+“a”+3	Selects justification mode	6-15
ESC+SP+n	Sets character dots spacing	6-15

CHARACTER SET SELECTION

Name	Function	Page
ESC+“4”	Sets Italic printing	6-16
ESC+“5”	Releases Italic printing	6-16
ESC+“R”+n	Sets international character set	6-16
ESC+“7”	Selects graphic Character Set 1	6-17
ESC+“6”	Selects graphic Character Set 2	6-17
ESC+“t”+n	Selects alternate character set	6-18

BIT IMAGE (GRAPHICS) MODE SELECTION

Name	Function	Page
ESC+“K”+n ₁ +n ₂	Sets 8-pin image standard density (60 dpi)	6-18
ESC+“L”+n ₁ +n ₂	Sets 8-pin image double density (120 dpi)	6-18
ESC+“Y”+n ₁ +n ₂	Sets 8-pin image double density/ double speed (120 dpi)	6-19
ESC+“Z”+n ₁ +n ₂	Sets 8-pin bit image quadruple density (240 dpi)	6-19

Epson LQ-1050 Mode Commands

BIT IMAGE (GRAPHICS) MODE SELECTION (continued)

Name	Function	Page
ESC+“*”+m +n ₁ +n ₂	Sets bit image mode selection (8-pin 60, 120, 120D, 240, 80, 90, 24-pin 60, 120, 90, 180, 360)	6-20
ESC+“?”+n+m	Reassigns graphics mode density	6-21

PAPER FEED SELECTION — Amount

Name	Function	Page
ESC+“0”	Sets paper feed to 1/8 inch (3.2 mm)	6-21
ESC+“2”	Sets paper feed to 1/6 inch (4.2 mm)	6-22
ESC+“A”+n	Sets paper feed to n/60 inch	6-22
ESC+“3”+n	Sets paper feed to n/180 inch	6-22
ESC+“+”+n	Sets paper feed to n/360 inch	6-23

PAPER FEED SELECTION — Execution

Name	Function	Page
LF	Feeds paper one line	6-23
FF	Feeds paper to next top of form	6-24
ESC+“J”+n	Executes paper feed of n/180 inch for one line	6-24
ESC+“j”+n	Executes reverse paper feed of n/180 inch for one line	6-25

PAGE FORMAT CONTROL

Name	Function	Page
ESC+“C”+0+n	Sets page length in inches	6-26
ESC+“C”+n	Sets page length in lines	6-26
ESC+“l”+n	Sets left margin	6-27
ESC+“Q”+n	Sets right margin	6-28
ESC+“N”+n	Sets skip perforation	6-28
ESC+“O”	Releases skip perforation	6-28

Epson LQ-1050 Mode Commands

TABULATION—Horizontal

Name	Function	Page
ESC+“D”+n ₁ +...+n _x +0	Sets horizontal tab	6-29
ESC+“D”+0	Releases horizontal tab	6-29
HT	Executes horizontal tab	6-29

TABULATION—Vertical

Name	Function	Page
ESC+“B”+n ₁ +...+n _x +0	Sets vertical tab	6-30
ESC+“B”+0	Releases vertical tab	6-30
VT	Executes vertical tab	6-30
ESC+“/”+n	Sets VFU channel	6-31
ESC+“b”+m +n ₁ +...+n _x +0	Sets VFU tabulation	6-31
ESC+“b”+m+0	Releases VFU tabulation	6-31

CARRIAGE CONTROL

Name	Function	Page
BS	Prints, then backspaces one character	6-32
CR	Prints a line, then returns carriage	6-32
ESC+“<”	Homes the printhead	6-32
ESC+“U”+1	Sets single direction printing	6-33
ESC+“U”+0	Releases single direction printing	6-33
ESC+“s”+1	Sets half speed printing	6-33
ESC+“s”+0	Releases half speed printing	6-33
ESC+“\$”+n ₁ +n ₂	Moves the printhead to an absolute horizontal position	6-33
ESC+“\”+n ₁ +n ₂	Moves the printhead to a relative horizontal position	6-34

Epson LQ-1050 Mode Commands

DATA CONTROL

Name	Function	Page
CAN	Clears data in line buffer	6-34
DC1	Selects printer remotely	6-34
DC3	Deselects printer remotely	6-35
DEL	Deletes last printable character	6-35
ESC+“>”	Sets MSB on	6-35
ESC+“=”	Sets MSB off	6-36
ESC+“#”	Cancels MSB setting	6-36

DOWNLOAD CHARACTER SELECTION

Name	Function	Page
ESC+“&”+0 +n+m	Defines download font	6-37
ESC+“%”+0	Selects ROM CG	6-37
ESC+“%”+1	Selects download CG	6-37
ESC+“.”+0+n +0	Copies internal ROM CG font into download CG	6-38

MISCELLANEOUS

Name	Function	Page
BEL	Sounds the buzzer	6-38
ESC	First byte of multi-byte control codes	6-38
NUL	Last byte of certain multi-byte control codes	6-39
ESC+“@”	Initializes the printer	6-39
ESC+EM+n	Cut Sheet Feeder control	6-39

Epson LQ-1050 Mode Commands

LETTER QUALITY (LQ) FONT:

Selects print quality font printing.

Name:	ESC	"x"	n	(n=0, 1, 2)
Dec.:	27	120	n	
Hex.:	1B	78	n	

Comments:

- This command sets letter quality printing in whichever pitch is set at the time.
- Sub/superscript characters can be printed in the letter quality font.
- The following values of n can be used:
 - n=0: Draft font
 - n=1: LQ font
 - n=2: SLQ font (Roman)
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

FONT STYLE:

Selects font style.

Name:	ESC	"k"	n	(n=0, 1, 2, 3, 4, 5, 6)
Dec.:	27	107	n	
Hex.:	1B	6B	n	

Comments:

- The following values of n can be used:
 - n=0: Roman font
 - n=1: Sans Serif font
 - n=2: Courier font
 - n=3: Prestige font
 - n=4: Script font
 - n=5: Orator font
 - n=6: Bold PS font
- This command is effective only in letter quality mode (ESC+"x"+1).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

SUB/SUPERSCRIP FONT:

Selects sub/superscript font with characters printed in the bottom/top area of the line.

Name:	Set: ESC "S" n	Release: ESC "T"
	(subscript: n=1/superscript: n=0)	
Dec.:	27 83 n	27 84
Hex.:	1B 53 n	1B 54

Comments:

- Sub/superscript characters are $\frac{2}{3}$ normal height.
- In PS mode, font and pitch are reduced to $\frac{2}{3}$ their original width. In the other modes, font is reduced to $\frac{2}{3}$ their original width and pitch is normal width. Refer to Appendix B.
- In draft mode, characters are normal width.

PICA PITCH:

Sets printing to 10 characters per inch (up to 136 characters per line).

Name:	ESC "P"
Dec.:	27 80
Hex.:	1B 50

Comments:

- When pica and compressed are set simultaneously output is 17 cpi (up to 233 cpl).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

ELITE PITCH:

Sets printing to 12 characters per inch (up to 163 characters per line).

Name: ESC "M"
Dec.: 27 77
Hex.: 1B 4D

Comments:

- When elite and compressed are set simultaneously, output is 20 cpi (up to 272 cpl).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

MICRON PITCH:

Sets printing to 15 characters per inch (up to 204 characters per line).

Name: ESC "g"
Dec.: 27 103
Hex.: 1B 67

Comments:

- When micron and compressed are set simultaneously output is 15 cpi (up to 204 cpl).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

COMPRESSED PITCH:

Sets printing to 17 characters per inch (up to 233 characters per line).

Name:	Set:	SI	or	ESC	SI	Release:	DC2
Dec.:		15	or	27	15		18
Hex.:		0F	or	1B	0F		12

Comments:

- When pica and compressed are set simultaneously, output is 17 cpi (up to 233 characters per line).
- When elite and compressed are set simultaneously, output is 20 cpi (up to 272 cpl).
- When micron and compressed are set simultaneously, output is 15 cpi (up to 204 cpl).
- When PS (Proportional Spacing) and compressed are set simultaneously, output is compressed PS pitch.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

PROPORTIONAL SPACING:

Sets proportional spacing between characters.

Name:	Set:	ESC	"p"	1	Release:	ESC	"p"	0
Dec.:		27	112	1		27	112	0
Hex.:		1B	70	01		1B	70	00

Comments:

- If proportional spacing is set together with pica, elite or micron pitch, subsequent output is printed in Proportional Spacing (setting with compressed pitch is printed in compressed PS).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

PROGRAMMABLE PITCH/HIGHLIGHTING:

Sets a combination of character pitch and/or highlighting.

Name: ESC “!” n (0≤n≤255)
Dec.: 27 33 n
Hex.: 1B 21 n

Comments:

- Print modes correspond to the setting of each bit, as illustrated below:

Bit	7 (MSB)	6	5	4	3	2	1	0 (LSB)
“1”	Under- lining	Italic	Double width	Double printing	Empha- sized	Com- pressed	PS	Elite
“0”	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Pica

- Bits 0, 1 and 2 pertain only to pitch.
- If n=49 (31_{HEX}), bits 0, 4 and 5 are set to “1” producing double width, elite double printing.
- Pitch and highlight combinations are determined by the value of n.
- Invalid values of n follow rules noted in individual commands.
- When elite and compressed are set simultaneously output is 20 cpi (up to 272 cpl).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

EMPHASIZED PRINTING:

Sets printing to twice the original horizontal dot density.

Name: Set: ESC “E” Release: ESC “F”
Dec.: 27 69 27 70
Hex.: 1B 45 1B 46

Comments:

- Emphasized characters are printed at half speed.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

DOUBLE HIGH PRINTING:

Sets double high printing.

Name:	Set:	ESC “w”	1	Release:	ESC “w”	0	
Dec.:		27	119	1	27	119	0
Hex.:		1B	77	01	1B	77	00

Comment:

- **PANEL LOCK** in the Function mode affects this command.
(See pages 3-19, 3-20.)

DOUBLE WIDE PRINTING—SINGLE LINE:

Sets double wide (elongated) character printing for one line only.

Name:	Set:	SO or ESC SO	Release:	DC4 or ESC “W”	0	
Dec.:		14 or 27	14	20 or 27	87	0
Hex.:		0E or 1B	0E	14 or 1B	57	00

Comments:

- Single line double wide printing is released when:
 - a LF, FF or VT is executed.
 - the printer is initialized.
 - DC4 or ESC+“W”+0 is executed.
 - ESC+“!”+0 is executed.
- **PANEL LOCK** in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

DOUBLE WIDE PRINTING:

Sets double wide (elongated) character printing.

Name:	Set:	ESC "W"	1	Release:	ESC "W"	0	
Dec.:		27	87	1	27	87	0
Hex.:		1B	57	01	1B	57	00

Comments:

- DC4 will not release the double wide printing set by ESC+"W"+1.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

6

OUTLINE AND SHADOW PRINTING:

Sets outline and shadow printing.

Name:	ESC "q"	n	
Dec.:	27	113	n
Hex.:	1B	71	n

Comments:

- The following values of n can be used.
 - n=0: Reset
 - n=1: Outline
 - n=2: Shadow
 - n=3: Outline with Shadow
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

DOUBLE STRIKE PRINTING:

Sets double printing.

Name:	Set:	ESC "G"	Release:	ESC "H"
Dec.:		27 71		27 72
Hex.:		1B 47		1B 48

Comments:

- Double strike printing prints each line of data with two passes of the printhead.
 - PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

UNDERLINING:

Sets continuous underlining of characters.

Name:	Set:	ESC "-"	1	Release:	ESC "-"	0
Dec.:		27 45	1		27 45	0
Hex.:		1B 2D	01		1B 2D	00

Comment:

- Bit image data, spaces set by the HT code and IBM graphic characters are not underlined.

Epson LQ-1050 Mode Commands

SCORE:

Sets/releases score.

Name:	ESC	“(”	“-”	n ₁	n ₂	m	d ₁	d ₂
Dec.:	27	40	45	n ₁	n ₂	m	d ₁	d ₂
Hex.:	1B	28	2D	n ₁	n ₂	m	d ₁	d ₂

Comments:

- Use decimal or hexadecimal values for all variables, not ASCII characters.
- The following values of n₁, n₂ and m can be used.
 - n₁=3
 - n₂=0
 - m=1
- The value of d₁ determines the location of the score:
 - d₁=1: Underline
 - d₁=2: Strikethrough
 - d₁=3: Overscore
- The value of d₂ determines whether the score line is single, double, broken or continuous:
 - d₂=0: Cancel the score line selected by d₁
 - d₂=1: Single continuous line
 - d₂=2: Double continuous line
 - d₂=5: Single broken line
 - d₂=6: Double broken line
- Bits 0, 1 and 2 of d₂ determine the characteristics of the score line as shown below:

	Bit 2	Bit 1	Bit 0
On (1)	Broken line	Double line on	Single line on
Off (0)	Continuous line	Double line off	Single line off

Note:

- If Bit 1 and Bit 0 are both off, the selected score is cancelled. Double line and single line scores cannot be combined at the same score position.

Epson LQ-1050 Mode Commands

WORD PROCESSING MODE SELECTION:

Selects word processing mode.

Name:	ESC	"a"	n	(n=0, 1, 2, 3)
Dec.:	27	97	n	
Hex.:	1B	61	n	

Comment:

- The following values of n can be used.
 - n=0: Releases word processing mode.
 - n=1: Selects centering mode.
 - n=2: Selects right alignment mode.
 - n=3: Selects justification mode.
-

CHARACTER DOT SPACING:

Sets character dot spacing until changed.

Name:	ESC	SP	n	($0 \leq n \leq 127$)
Dec.:	27	32	n	
Hex.:	1B	20	n	

Comments:

- Sets the amount of dot space (Draft: $\frac{1}{120}$ inch, LQ: $\frac{1}{180}$ inch) added to the right of each character.
- This command allows microjustification.

Epson LQ-1050 Mode Commands

ITALIC FONT:

Selects italic character printing.

Name:	Set: ESC “4”	Release: ESC “5”
Dec.:	27 52	27 53
Hex.:	1B 34	1B 35

Comments:

- Italic characters are printed in place of characters in locations 32_{DEC}~126_{DEC} (20_{HEX}~7E_{HEX}).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

6

INTERNATIONAL CHARACTER SET:

Selects any one of 14 language or Legal character sets.

Name:	ESC “R”	n	(0≤n≤13, n=64)
Dec.:	27	82	n
Hex.:	1B	52	n

Comments:

- Page A-10 identifies the characters generated by the appropriate codes.
- International character sets can be set in the Function mode (see page 3-24).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

GRAPHIC CHARACTER SET I:

Selects graphic character set 1.

Name: ESC “7”
Dec.: 27 55
Hex.: 1B 37

Comments:

- Refer to Appendix A.
 - This command is operational only when the graphic character set is selected by ESC+“t”+1.
 - PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

GRAPHIC CHARACTER SET II:

Selects graphic character set 2.

Name: ESC “6”
Dec.: 27 54
Hex.: 1B 36

Comments:

- Refer to Appendix A.
- This command is operational only when the graphic character set is selected by ESC+“t”+1.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

ALTERNATE CHARACTER SET:

Selects alternate character set.

Name:	ESC	"t"	n	(n=0, 1, 2)
Dec.:	27	116	n	
Hex.:	1B	74	n	

Comments:

- The following values of n can be used.
 - n=0: Italic
 - n=1: Graphic character set
 - n=2: Remaps any downloaded characters from 0-127 to 128-255.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

8-PIN STANDARD DENSITY GRAPHICS:

Sets standard density graphics mode [60 dots per inch (25.4 mm)/816 dots per line]. (For detailed information, refer to Section 5.3.)

Name:	ESC	"K"	n ₁	n ₂	Data
Dec.:	27	75	n ₁	n ₂	Data
Hex.:	1B	4B	n ₁	n ₂	Data

8-PIN DOUBLE DENSITY GRAPHICS:

Sets double density graphics mode [120 dots per inch (25.4 mm)/1632 dots per line]. (For detailed information, refer to Section 5.3.)

Name:	ESC	"L"	n ₁	n ₂	Data
Dec.:	27	76	n ₁	n ₂	Data
Hex.:	1B	4C	n ₁	n ₂	Data

Epson LQ-1050 Mode Commands

8-PIN DOUBLE SPEED/DOUBLE DENSITY GRAPHICS:

Sets double speed, double density graphics mode [120 dots per inch (25.4 mm)/1632 dots per line]. (For detailed information, refer to Section 5.3.)

Name:	ESC	"Y"	n1	n2	Data
Dec.:	27	89	n1	n2	Data
Hex.:	1B	59	n1	n2	Data

Comment:

- Horizontal adjacent dots cannot be printed.
-

8-PIN QUADRUPLE DENSITY GRAPHICS:

Sets quadruple density graphics mode [240 dots per inch (25.4 mm)/3264 dots per line]. (For detailed information, refer to Section 5.3.)

Name:	ESC	"Z"	n1	n2	Data
Dec.:	27	90	n1	n2	Data
Hex.:	1B	5A	n1	n2	Data

Comment:

- Horizontal adjacent dots cannot be printed.

Epson LQ-1050 Mode Commands

BIT IMAGE MODE SELECTION:

Selects one of the 8-pin on 24-pin bit image graphic modes. (For detailed information, refer to Section 5.3.)

Name: ESC “*” m n1 n2 Data
(m=0, 1, 2, 3, 4, 6, 32, 33, 38, 39, 40)
Dec.: 27 42 m n1 n2 Data
Hex.: 1B 2A m n1 n2 Data

Comments:

- The following table illustrates the various modes based upon the values of m.

m	pin	Dots/Inch	Dots/Line	
0	8	60	816	Standard Density
1	8	120	1632	Double Density
2	8	120	1632	Double Speed, Double Density
3	8	240	3264	Quadruple Density
4	8	80	1088	CRT I
6	8	90	1224	CRT II
32	24	60	816	Standard Density
33	24	120	1632	Double Density
38	24	90	1224	CRT III
39	24	180	2448	Triple Density
40	24	360	4896	Hex Density

- When m=2, 3, 40, horizontal adjacent dots cannot be printed.

Epson LQ-1050 Mode Commands

BIT IMAGE MODE REASSIGNMENT:

Reassigns bit image graphics mode density.

Name:	ESC	"?"	n	m
	(n=75, 76, 89, 90			m=0, 1, 2, 3, 4, 6, 32, 33, 38, 39, 40)
Dec.:	27	63	n	m
Hex.:	1B	3F	n	m

Comments:

- The value of n specifies the graphics mode which is to be reassigned:
 - n=75: Reassign Standard Density (ESC+"K"+n₁+n₂)
 - n=76: Reassign Double Density (ESC+"L"+n₁+n₂)
 - n=89: Reassign Double speed, Double Density
(ESC+"Y"+n₁+n₂)
 - n=90: Reassign Quadruple Density (ESC+"Z"+n₁+n₂)
 - The value of m specifies the graphics mode to which the original is to be reassigned. Refer to Table 5.1 on page 5-16.
-

1/8 INCH PAPER FEED:

Sets paper feed amount to 1/8 inch (3.2 mm).

Name:	ESC	"0"
Dec.:	27	48
Hex.:	1B	30

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

1/6 INCH PAPER FEED:

Sets paper feed amount to 1/6 inch (4.23 mm).

Name: ESC "2"
Dec.: 27 50
Hex.: 1B 32

Comment:

- **PANEL LOCK** in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

6

n/60 INCH PAPER FEED:

Sets programmable paper feed amount to n/60 inch.

Name: ESC "A" n
Dec.: 27 65 n
Hex.: 1B 41 n

Comments:

- n/60 inch paper feed is valid for $0 \leq n \leq 127$.
 - **PANEL LOCK** in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

n/180 INCH PAPER FEED:

Sets programmable paper feed amount to n/180 inch.

Name: ESC "3" n
Dec.: 27 51 n
Hex.: 1B 33 n

Comments:

- n/180 inch paper feed is valid for $0 \leq n \leq 255$.
- **PANEL LOCK** in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

⅓ INCH PAPER FEED:

Sets programmable paper feed amount to ⅓ inch.

Name:	ESC “+”	n
Dec.:	27 43	n
Hex.:	1B 2B	n

Comments:

- ⅓ inch paper feed is valid for $0 \leq n \leq 255$.
 - PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

LINE FEED (LF):

Causes data in line buffer to be printed and then executes a single line feed.

Name:	LF
Dec.:	10
Hex.:	0A

Comments:

- When the new line position falls within the perforation skip area, the paper advances to the next top of form position if skip over perforation is turned on through software.
- If there is no data, “space” data (ASCII 32), or blanks between HT print positions in the line buffer, LF feeds the paper by 1 line.
- LF code releases single line double width printing set by SO or ESC+SO.
- The amount of line feed depends upon the lines per inch set by the line feed amount command or the EZ Set Operator Panel.

Epson LQ-1050 Mode Commands

FORM FEED (FF):

Feeds paper to next top of form position after printing data in the line buffer.

Name: FF
Dec.: 12
Hex.: 0C

Comments:

- FF releases single-line double width printing set by SO or ESC+SO.
- Amount of form feed depends upon page length set by the page length control command or the EZ Set Operator Panel.

6

$\frac{n}{180}$ INCH SINGLE LINE PAPER FEED:

Prints out the data in the line buffer and feeds the paper $\frac{n}{180}$ inch.

Name: ESC "J" n
Dec.: 27 74 n
Hex.: 1B 4A n

Comments:

- Single-line, $\frac{n}{180}$ inch paper feed is valid for $0 \leq n \leq 255$.
- This command sets the paper feed for ONE line only. The carriage does not return to the left margin position. Instead, printing of the next line begins where previous printing left off.
- This command does not release single-line double width printing set by SO or ESC+SO.

Epson LQ-1050 Mode Commands

$\frac{1}{180}$ INCH REVERSE DIRECTION SINGLE LINE PAPER FEED:

Prints out the data in the line buffer and feeds the paper $\frac{1}{180}$ inch in the reverse direction.

Name:	ESC	"j"	n
Dec.:	27	106	n
Hex.:	1B	6A	n

Comments:

- Reverse, single line $\frac{1}{180}$ inch paper feed is valid for $0 \leq n \leq 255$.
- This command sets reverse direction paper feed for one line only. The carriage will not return to the left margin position. Instead, the printing of the next line begins where the previous printing left off.
- This command does not release single-line double width printing set by SO or ESC+SO.

Note:

- Reverse paper feed cannot be executed in the area within 3.6 inches (91.4 mm) of the bottom perforation. Additionally, the perforation should not be included in the area of reverse paper feed.
- Multi-part forms or pull tractor feed paper should not be used with reverse paper feed. If reverse feeding is necessary in pull mode, set REV LF/PULL in the INSTALL menu to ON through the Function mode (see page 3-26).

Epson LQ-1050 Mode Commands

PAGE LENGTH (INCHES):

Sets page length in inches.

Name:	ESC	"C"	0	n
Dec.:	27	67	0	n
Hex.:	1B	43	00	n

Comments:

- Upon receipt of ESC+"C"+0+n, the present line position becomes the top of page position.
- The value of n must be in the range $0 \leq n \leq 22$.
- ESC+"C"+0+n releases the skip perforation settings.
- The page length does not change even if the paper feed amount is changed.
- The terms "form" and "page" are interchangeable.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

PAGE LENGTH (LINES):

Sets page length in number of lines.

Name:	ESC	"C"	n
Dec.:	27	67	n
Hex.:	1B	43	n

Comments:

- Upon receipt of ESC+"C"+n, the present line position becomes the top of page position.
- The value of n must be in the range $1 \leq n \leq 127$. If n=0, page length returns to the inch designation.
- ESC+"C"+n releases the skip perforation settings.
- The page length does not change even if the paper feed amount is changed.
- The terms "form" and "page" are interchangeable.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

LEFT MARGIN:

Sets position of left margin.

Name: ESC "l" n
Dec.: 27 108 n
Hex.: 1B 6C n

Comments:

- If the value of n exceeds the right margin value, ESC+"l"+n is ineffective and the left margin does not change.
- Setting the left margin position clears all data in the line buffer.
- In proportional spacing, the value of n is based on 10 cpi.
- Once the left margin position is set, a change in the character mode will not alter this left margin setting.
- Permissible values of n are given below.

	8" print line	13.6" print line
PICA	$0 \leq n \leq 78$	$0 \leq n \leq 134$
ELITE	$0 \leq n \leq 93$	$0 \leq n \leq 160$
MICRON	$0 \leq n \leq 117$	$0 \leq n \leq 201$
COMPRESSED	$0 \leq n \leq 133$	$0 \leq n \leq 229$

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

RIGHT MARGIN:

Sets position of right margin.

Name: ESC "Q" n
Dec.: 27 81 n
Hex.: 1B 51 n

Comments:

- Permissible values of n are given below.

	8" print line	13.6" print line
PICA	$2 \leq n \leq 80$	$2 \leq n \leq 136$
ELITE	$3 \leq n \leq 96$	$3 \leq n \leq 163$
MICRON	$3 \leq n \leq 120$	$3 \leq n \leq 204$
COMPRESSED	$4 \leq n \leq 137$	$4 \leq n \leq 233$

- If the value of n exceeds the left margin value, ESC+"Q"+n is ignored.
- Setting the right margin clears all data in the line buffer.
- In proportional spacing, the value of n is based on 10 cpi.
- Once the right margin position is set, a change in the character mode will not alter this right margin setting.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

SKIP PERFORATION:

Sets skip perforation.

Name: Set: ESC "N" n Release: ESC "O"
Dec.: 27 78 n 27 79
Hex.: 1B 4E n 1B 4F

Comments:

- The value of n specifies the number of lines (or n times the current line spacing amount) to be skipped at the bottom of the page.
- This command is effective only for $1 \leq n \leq 127$. If $n > 128$, the value is processed as $n - 128$, if $n = 128$ the command is ignored.
- The skip perforation amount does not change even if the paper feed amount is changed following a skip perforation designation.
- The skip perforation setting is released upon receipt of the page length designation command.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
- The skip perforation command overrides the front panel Bottom margin setting.

Epson LQ-1050 Mode Commands

HORIZONTAL TAB STOP SETTING:

Sets horizontal tabulations to specified values.

Name:	Set:	ESC	"D"	n_1	$n_2 \dots n_x$	0	Release:	ESC	"D"	0
Dec.:		27	68	n_1	$n_2 \dots n_x$	0		27	68	0
Hex.:		1B	44	n_1	$n_2 \dots n_x$	00		1B	44	00

Comments:

- Horizontal tabs are set from the left margin position.
- Horizontal tabs must be designated such that $n_1 < n_2 < \dots < n_x$.
- A maximum of 32 tabs may be set on a single line.
- ESC+"D"+ $n_1+n_2+\dots+n_x+0$ sets horizontal tab stops. The HT command executes the tab designation.
- In proportional spacing, horizontal tabs are set based on 10 cpi.
- When the left margin is changed, horizontal tabs will be moved based on new margin setting.
- When the printer is powered up, TAB is automatically set every 8 characters.
- If the pitch is altered after designation of horizontal tabs, the tab positions do not move.

HORIZONTAL TAB EXECUTION:

Executes the horizontal TAB as designated by ESC+"D"+ $n_1+n_2+\dots+n_x+0$.

Name:	HT
Dec.:	9
Hex.:	09

Comments:

- If the value of the horizontal TAB is less than present column position, then HT is ignored.
- When in underline mode, the blank spaces between consecutive HT print positions are not underlined.

Epson LQ-1050 Mode Commands

VERTICAL TAB STOP SETTING:

Sets vertical tabulation to specified values.

Name:	Set:	ESC	"B"	n ₁	n ₂ ...n _x	0	Release:	ESC	"B"	0
Dec.:		27	66	n ₁	n ₂ ...n _x	0		27	66	0
Hex.:		1B	42	n ₁	n ₂ ...n _x	00		1B	42	00

Comments:

- VT is set from the top of page position.
- Vertical tabs must be designed such that $n_1 < n_2 \dots < n_x$.
- ESC+"B"+n₁+n₂+...+n_x+0 sets vertical tab stops. The VT command executes the tab designation.
- If the paper feed amount is changed after a designation of vertical tabs, the positions do not change.
- VT settings are also released by page length designation commands.
- A maximum of 16 tabs may be set.

VERTICAL TAB EXECUTION:

Executes the vertical TAB as designated by ESC+"B"+n₁+n₂+...+n_x+0, ESC+"b"+m+n₁+n₂+...n_x+0.

Name:	VT
Dec.:	11
Hex.:	0B

Comments:

- When TABs are set with VT or VFU setting command and when there is no tab setting on a position exceeding the present line, data is printed out and paper is fed to the next top of page position (same as FF).
- On power up no vertical tabs have been set, therefore when a VT is sent the paper advances one line.
- When vertical TAB is cleared by ESC+"B"+0, execution of VT causes data in the line buffer to be printed and does not advance the paper.

Epson LQ-1050 Mode Commands

VFU CHANNEL SELECTION:

Selects one of eight channels in the Vertical Format Unit (VFU).

Name:	ESC	“/”	n	($0 \leq n \leq 7$)
Dec.:	27	47	n	
Hex.:	1B	2F	n	

Comments:

- The value of n must be in the range $0 \leq n \leq 7$ and selects one of eight channels (0~7).
- Channel 0 is the default setting.

VFU SETTING:

Sets the tab position of any channel in the VFU (Vertical Format Unit).

Name:	Set: ESC	“b”	m	n ₁	n ₂ ...n _x	0	Release: ESC	“b”	m	0
						($0 \leq m \leq 7$)				($1 \leq x \leq 16$)
Dec.:	27	98	m	n ₁	n ₂ ...n _x	0	27	98	m	0
Hex.:	1B	62	m	n ₁	n ₂ ...n _x	00	1B	62	m	00

Comments:

- The VFU has 8 channels. A maximum of 16 vertical tabs can be set by each channel.
- The VFU is valid for $0 \leq m \leq 7$ and selects one channel based on the value of m.
- Any VFU setting exceeding the page length is ineffective.
- To operate the VFU, input the VT code (11_{DEC}) after selecting the channel via channel selection command (ESC+“/”+n).
- The VFU position does not change even if paper feed amount is altered after VFU setting.
- The VFU setting is also released by the page length designation commands.
- The vertical tab specified with ESC+“B”+n₁+n₂+...n_x+0 is set to VFU channel 0.

Epson LQ-1050 Mode Commands

BACKSPACE:

Prints data in line buffer and backspaces one space.

Name: BS
Dec.: 8
Hex.: 08

Comment:

- Since BS backspaces the width of a character, the backspacing amount will depend upon the pitch set when the BS code is executed.
-

6

CARRIAGE RETURN:

Prints all data in line buffer and designates that the next line starts at the left margin.

Name: CR
Dec.: 13
Hex.: 0D

Comments:

- Certain computers issue an automatic line feed with a carriage return. Check your computer manual for details.
 - When automatic LF is set to ON through the Function mode (see page 3-26), the paper is fed (a LF is executed automatically) whenever a CR code is executed.
-

HOME PRINTHEAD:

Causes printhead to return to its home position.

Name: ESC "<"
Dec.: 27 60
Hex.: 1B 3C

Epson LQ-1050 Mode Commands

SINGLE DIRECTION:

Sets single direction (left to right) printing mode.

Name:	Set:	ESC "U"	1	Release:	ESC "U"	0	
Dec.:		27	85	1	27	85	0
Hex.:		1B	55	01	1B	55	00

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

HALF SPEED PRINTING:

Sets printing to half speed.

Name:	Set:	ESC "s"	1	Release:	ESC "s"	0	
Dec.:		27	115	1	27	115	0
Hex.:		1B	73	01	1B	73	00

Comment:

- Half speed printing can be set only in the draft pica, draft elite, standard density image, double speed double density image, CRT I image and CRT II image modes.
-

ABSOLUTE HORIZONTAL POSITION:

Moves the printhead to an absolute horizontal position.

Name:	ESC "\$"	n1	n2
Dec.:	27	36	n1 n2
Hex.:	1B	24	n1 n2

Comment:

- This command moves the printhead to a position $n_1 + 256 \times n_2$ dots (units) from the left margin. Each unit equals $\frac{1}{60}$ th of an inch.

Epson LQ-1050 Mode Commands

RELATIVE HORIZONTAL POSITION:

Moves the printhead to a relative horizontal position.

Name: ESC “\” n₁ n₂
Dec.: 27 92 n₁ n₂
Hex.: 1B 5C n₁ n₂

Comments:

- This command moves the printhead $(n_1 + 256 \times n_2) / 120$ inch in draft, or $(n_1 + 256 \times n_2) / 180$ inch in LQ from the current position.
- The printhead can be moved to the right or left.
To move m dots to right: $m = n_1 + (n_2 \times 256)$
To move m dots to left: $m = 65536 - [n_1 + (n_2 \times 256)]$
To specify to the printer how many dots to move either right or left, first multiply the amount of inches by 120 for draft or 180 for LQ. The result is the value m. To find the values for n₁ and n₂ divide the value m by 256. For example:

$$m = 5'' \times 120 = 600 \text{ dots} \quad 256 \quad \begin{array}{r} 2 = n_1 \\ \hline 600 \\ 512 \\ \hline 88 = n_2 \end{array}$$

CANCEL:

Clears all data in the line buffer.

Name: CAN
Dec.: 24
Hex.: 18

REMOTE PRINTER SELECT:

Selects the printer remotely, enabling it to receive data.

Name: DC1 (Device Control 1)
Dec.: 17
Hex.: 11

Comments:

- Receipt of DC1 while the printer is deselected by DC3 enables the printer to receive data.
- The printer buffer data previously received between DC3 and DC1 is lost.

Epson LQ-1050 Mode Commands

REMOTE PRINTER DESELECT:

Deselects the printer remotely, disabling it from receiving data.

Name: DC3 (Device Control 3)
Dec.: 19
Hex.: 13

Comment:

- All data sent in deselect status becomes invalid. In order to return to select status, send DC1 code.

6

DELETE:

Deletes the last character stored in the line buffer.

Name: DEL
Dec.: 127
Hex.: 7F

Comment:

- Only ordinary text may be DELETED. Bit image data, spacing between output generated by consecutive TABs, and commands cannot be DELETED.

MSB ON:

Sets the Most Significant Bit to 1.

Name: ESC ">"
Dec.: 27 62
Hex.: 1B 3E

Comments:

- ESC+">" has no effect on bit image data.
- This setting can be released by ESC+""".
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

MSB OFF:

Sets the Most Significant Bit to 0.

Name: ESC “=”
Dec.: 27 61
Hex.: 1B 3D

Comments:

- ESC+“=” has no effect on bit image data.
- This setting can be released by ESC+“#”.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

6

CANCELS MSB SETTING:

Sets printer to receive 8th bit “as is”.

Name: ESC “#”
Dec.: 27 35
Hex.: 1B 23

Comments:

- This setting has no effect on bit image data.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Epson LQ-1050 Mode Commands

FONT DOWNLOADING:

Defines downloadable characters into specified address locations in RAM (see Section 5.2).

Name:	ESC “&”	0	n	m	d ₀	d ₁	d ₂	P ₁ ...P _x	
Dec.:	27	38	0	n	m	d ₀	d ₁	d ₂	P ₁ ...P _x
Hex.:	1B	26	00	n	m	d ₀	d ₁	d ₂	P ₁ ...P _x

Comments:

- The values n and m are the ASCII address locations of the first and last characters being defined.
- The values of d₀, d₁ and d₂ define the character cell.
d₀=Left Space d₁=Body d₂=Right Space
- The values of d₀, d₁ and d₂ vary with pitch as follows:

	d ₁	d ₀ +d ₁ +d ₂ (total)
Draft	9	12
LQ 10 cpi	29	36
LQ 12 cpi	23	30
LQ 15 cpi	15	24
PS	37	42

Note:

- In PS, values of d₁ and d₀+d₁+d₂ are at the maximum allowable width.

SELECTS ROM CG OR DOWNLOADED CG:

(See Section 5.2.)

Name:	ESC “%”	n	(n=0, 1)
Dec.:	27	37	n
Hex.:	1B	25	n

Comments:

- The following values of n can be used.
n=0: Select ROM Character Generator (CG)
n=1: Select download CG

Epson LQ-1050 Mode Commands

ROM CHARACTER GENERATION SET COPY:

Copies internal ROM CG font into downloadable font area.

Name:	ESC	“:”	0	n	0	(n=0, 1, 2, 3, 4, 5, 6)
Dec.:	27	58	0	n	0	
Hex.:	1B	3A	00	n	00	

Comments:

- The values of n can be used in the same way as ESC+“k”+n.
- All ROM CG fonts in draft and LQ modes are copied to the downloadable font area.
- Upon receipt of the command, all previous downloaded fonts will be changed to ROM CG fonts.
- When altering only part of the ROM CG, use this command before font downloading.

BELL:

Sounds buzzer for approximately 0.5 seconds.

Name:	BEL
Dec.:	7
Hex.:	07

ESCAPE:

First byte of each multi byte printer control code.

Name:	ESC
Dec.:	27
Hex.:	1B

Comment:

- Cannot be generated by the ESC key on certain computers.

Epson LQ-1050 Mode Commands

NULL:

Last byte of certain multi byte printer control codes.

Name:	NUL
Dec.:	0
Hex.:	00

RESET PRINTER:

Initializes printer, causing data in the line buffer, but not in the receive buffer, to be cleared.

Name:	ESC “@”
Dec.:	27 64
Hex.:	1B 40

Comment:

- Refer to Section 3.4 on page 3-32 for an explanation of printer initialization.
-

SELECTS CSF:

Selects Cut Sheet Feeder (CSF) mode ON/OFF.

Name:	ESC EM n
Dec.:	27 25 n
Hex.:	1B 19 n

Comments:

- The following values of n can be used.
 - n=“R”: Eject and Load a sheet
 - n=“0”: Cut Sheet Feeder mode is OFF
 - n=“4”: Cut Sheet Feeder mode is ON
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

Note:

- If the Cut Sheet Feeder mode is set to ON without installing the CSF, the paper will not feed correctly.

7. IBM Proprinter XL24E Mode Commands

This chapter covers the software commands when selecting the IBM Proprinter XL24E mode. The software commands are grouped into the following classifications:

FONT SELECTION

Name	Function	Page
ESC+"I"+n	Selects print style	7-5
ESC+"k"+n	Selects print font style	7-6
ESC+"S"+1	Selects subscript printing	7-6
ESC+"S"+0	Selects superscript printing	7-6
ESC+"T"	Releases sub/superscript printing	7-6

CHARACTER PITCH SELECTION

Name	Function	Page
ESC+“:”	Sets elite pitch (12 cpi) printing	7-7
SI	Sets compressed (17 cpi) printing	7-7
ESC+SI	Sets compressed (17 cpi) printing	7-7
DC2	Releases elite and compressed printing	7-7
ESC+“P”+1	Sets proportional spacing	7-7
ESC+“P”+0	Releases proportional spacing	7-7

CHARACTER HIGHLIGHT SELECTION

Name	Function	Page
ESC+“E”	Sets emphasized printing	7-8
ESC+“F”	Releases emphasized printing	7-8
ESC+“G”	Sets double strike printing	7-8
ESC+“H”	Releases double strike printing	7-8
SO	Sets single-line double wide printing	7-9
DC4	Releases single-line double wide printing	7-9
ESC+SO	Sets single-line double wide printing	7-9
ESC+“W”+1	Sets double wide printing	7-9
ESC+“W”+0	Releases double wide printing	7-9
ESC+“[”+“@” +n ₁ +n ₂ +m ₁ +m ₂ +m ₃ +m ₄	Sets double high & double wide printing	7-10
ESC+“-”+1	Sets underlining	7-11
ESC+“-”+0	Releases underlining	7-11
ESC+“_”+1	Sets overlining	7-11
ESC+“_”+0	Releases overlining	7-11

IBM Proprinter XL24E Mode Commands

CHARACTER SET SELECTION

Name	Function	Page
ESC+“7”	Selects alternate Character Set 1	7-11
ESC+“6”	Selects alternate Character Set 2	7-12
ESC+“[”+“T” +n ₁ +n ₂ +n ₃ +n ₄ +n ₅ +n ₆	Changes the current code page	7-12

BIT IMAGE (GRAPHICS) MODE SELECTION

Name	Function	Page
ESC+“K”+n ₁ +n ₂	Sets 8-pin image standard density (60 dpi)	7-13
ESC+“L”+n ₁ +n ₂	Sets 8-pin image double density (120 dpi)	7-13
ESC+“Y”+n ₁ +n ₂	Sets 8-pin image double density/double speed (120 dpi)	7-13
ESC+“Z”+n ₁ +n ₂	Sets 8-pin image quadruple density (240 dpi)	7-14
ESC+“*”+m +n ₁ +n ₂ (AGM only)	Sets bit image mode selection (8-pin 60, 80, 90, 120, 120D, 240) (24-pin 60, 90, 120, 180, 240, 360)	7-14
ESC+“[”+“g” +n ₁ +n ₂ +m	Sets bit image mode selection (8-pin 60, 120, 120D, 240) (24-pin 60, 120, 180, 360)	7-15

PAPER FEED SELECTION—Amount

Name	Function	Page
ESC+“0”	Sets paper feed to 1/8 inch (3.2 mm)	7-15
ESC+“1”	Sets paper feed to 7/32 inch (2.5 mm)	7-16
ESC+“2”	Executes line spacing set by ESC+“A”+n	7-16
ESC+“A”+n	Sets paper feed to 1/16 inch or 1/60 inch	7-16
ESC+“3”+n	Sets paper feed to 1/32 inch or 1/180 inch	7-17
ESC+“[”+“\” n ₁ +n ₂ +n ₃ n ₄ +n ₅ +n ₆	Selects the base line feed unit for ESC+“3” and ESC+“J”	7-17
ESC+“5”+1	Sets automatic line feed	7-18
ESC+“5”+0	Releases automatic line feed	7-18

IBM Proprinter XL24E Mode Commands

PAPER FEED SELECTION—Execution

Name	Function	Page
LF	Feeds paper one line	7-18
FF	Feeds paper to next top of form	7-19
ESC+“J”+n	Executes one-line paper feed of $\frac{n}{216}$ inch or $\frac{n}{180}$ inch	7-19

PAGE FORMAT CONTROL

Name	Function	Page
ESC+“C”+0+n	Sets page length in inches	7-20
ESC+“C”+n	Sets page length in lines	7-20
ESC+“X”+n ₁ +n ₂	Sets left and right margin	7-21
ESC+“N”+n	Sets skip perforation	7-22
ESC+“O”	Releases skip perforation	7-22
ESC+“4”	Sets top of form	7-22

TABULATION—Horizontal

Name	Function	Page
ESC+“D”+n ₁ +...+n _x +0	Sets horizontal tab	7-23
ESC+“D”+0	Releases horizontal tab	7-23
HT	Executes horizontal tab	7-23

TABULATION—Vertical

Name	Function	Page
ESC+“B”+n ₁ +...+n _x +0	Sets vertical tab	7-24
ESC+“B”+0	Releases vertical tab	7-24
VT	Executes vertical tab	7-24
ESC+“R”	Returns to default tabs	7-25

IBM Proprinter XL24E Mode Commands

CARRIAGE CONTROL

Name	Function	Page
BS	Prints, then backspaces one character	7-25
CR	Prints a line, then returns carriage	7-26
ESC+“U”+1	Sets single direction printing	7-26
ESC+“U”+0	Releases single direction printing	7-26
ESC+“d”+n ₁ + n ₂	Moves the printhead to a relative horizontal position	7-27

DATA CONTROL

Name	Function	Page
CAN	Clears data in line buffer	7-27
DC1	Selects printer remotely	7-27
ESC+“Q”+35	Deselects printer remotely	7-28

DOWN LINE LOAD CHARACTER SELECTION

Name	Function	Page
ESC+“=”+n ₁ + n ₂ +35+A ₁ + A ₂	Defines download font	7-28

MISCELLANEOUS

Name	Function	Page
BEL	Sounds the buzzer	7-28
ESC	First byte of multi-byte control codes	7-29
NUL	Last byte of certain multi-byte control codes	7-29
ESC+“\”+n ₁ + n ₂	Prints continuously from All Character Chart	7-29
ESC+“^”	Prints one character from All Character Chart	7-30
ESC+“j”	Sets OFF LINE mode	7-30
ESC+“[”+“K” + n ₁ +n ₂ +m + 35+p ₁ +p ₂	Resets to initial state	7-30

IBM Proprinter XL24E Mode Commands

PRINT STYLE SELECT:

Selects the printing fonts and quality.

Name:	ESC	"I"	n
Dec.:	27	73	n
Hex.:	1B	49	n

Comments:

- The following values of n can be used.
 - n=0: Internal characters Draft 10 cpi font
 - n=2: Internal characters LQ 10 cpi font
 - n=3: Internal characters Proportional LQ font
 - n=4: Download characters Draft 10 cpi font
 - n=6: Download characters LQ 10 cpi font
 - n=7: Download characters Proportional LQ font
 - n=8: Internal characters Draft 12 cpi font
 - n=10: Internal characters LQ 12 cpi font
 - n=12: Download characters Draft 12 cpi font
 - n=14: Download characters LQ 12 cpi font
 - n=16: Internal characters Draft 17 cpi font
 - n=18: Internal characters LQ 17 cpi font
 - n=20: Download characters Draft 17 cpi font
 - n=22: Download characters LQ 17 cpi font
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

FONT STYLE:

Selects font style.

Name:	ESC “k”	n	(n=0, 1, 2, 3, 4, 5, 6)
Dec.:	27	107	n
Hex.:	1B	6B	n

Comments:

- The following values can be used.
 - n=0: Roman font
 - n=1: Sans Serif font
 - n=2: Courier font
 - n=3: Prestige font
 - n=4: Script font
 - n=5: Orator font
 - n=6: Bold PS font
- IBM characters in locations 0~31_{DEC} (except 19, 20, 21_{DEC}) [00~1F_{HEX} (except 13, 14, 15_{HEX})] and 250~255_{DEC} (F0~FF_{HEX}) are printed in Courier font, regardless of font selection.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

SUB/SUPERScript FONT:

Selects sub/superscript font with characters printed in the bottom/top 2/3 area of the line.

Name:	Set: ESC “S”	n	Release: ESC “T”
	(subscript: n=1/superscript: n=0)		
Dec.:	27	83	n
Hex.:	1B	53	n

Comments:

- Sub/superscript characters are 2/3 normal height.
- Sub/superscript characters can be printed in the letter quality or draft mode.
- Sub/superscript characters are normal width.

IBM Proprinter XL24E Mode Commands

ELITE PITCH:

Sets printing to 12 characters per inch (up to 163 characters per line).

Name:	Set:	ESC “:”	Release:	DC2
Dec.:		27 58		18
Hex.:		1B 3A		12

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

7

COMPRESSED PITCH:

Sets printing to 17 characters per inch (up to 233 characters per line).

Name:	Set:	SI or ESC SI	Release:	DC2
Dec.:		15 or 27 15		18
Hex.:		0F or 1B 0F		12

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

PROPORTIONAL SPACING:

Sets proportional spacing between characters.

Name:	Set:	ESC “P” 1	Release:	ESC “P” 0
Dec.:		27 80 1		27 80 0
Hex.:		1B 50 01		1B 50 00

Comments:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

EMPHASIZED PRINTING:

Sets printing to twice the original horizontal dot density.

Name:	Set:	ESC "E"	Release:	ESC "F"
Dec.:		27 69		27 70
Hex.:		1B 45		1B 46

Comments:

- Emphasized characters are printed at half speed (100 cps in draft pica pitch).
 - PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

DOUBLE STRIKE PRINTING:

Sets double strike character printing.

Name:	Set:	ESC "G"	Release:	ESC "H"
Dec.:		27 71		27 72
Hex.:		1B 47		1B 48

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

DOUBLE WIDE PRINTING—SINGLE LINE:

Sets double wide (elongated) character printing for one line only.

Name:	Set:	SO	or	ESC	SO	Release:	DC4	or	ESC	"W"	0
Dec.:		14		27	14		20		27	87	0
Hex.:		0E		1B	0E		14		1B	57	00

Comments:

- Single line double wide printing is released when:
 - a LF, FF or VT is executed.
 - a CR is executed.
 - DC4 or ESC+"W"+0 is executed.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

DOUBLE WIDE PRINTING:

Sets double wide (elongated) character printing.

Name:	Set:	ESC	"W"	1	Release:	ESC	"W"	0
Dec.:		27	87	1		27	87	0
Hex.:		1B	57	01		1B	57	00

Comments:

- Double wide printing set by ESC+"W"+1 is only released by ESC+"W"+0.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

DOUBLE HIGH AND DOUBLE WIDE PRINTING:

Sets printing to double high, double wide or both at the same time.

Name:	ESC	“[”	“@”	n ₁	n ₂	m ₁	m ₂	m ₃	m ₄
Dec.:	27	91	64	n ₁	n ₂	m ₁	m ₂	m ₃	m ₄
Hex.:	1B	5B	40	n ₁	n ₂	m ₁	m ₂	m ₃	m ₄

Comments:

- The values of n₁, n₂, m₁ and m₂ must be used as follows:
n₁=4, n₂=0, m₁=0, m₂=0
- The value of m₃ selects both the line feed and character height as follows:

m ₃	Function	
	Line feed	Character height
0	Unchanged	Unchanged
1	Unchanged	Single-line
2	Unchanged	Double-high
16	Single	Unchanged
17	Single	Single-high
18	Single	Double-high
32	Double	Unchanged
33	Double	Single-high
34	Double	Double-high

- The value of m₄ selects the character width as follows:
m₄=0: No change
m₄=1: Single-width
m₄=2: Double-width
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

UNDERLINING:

Sets continuous underlining of characters.

Name:	Set:	ESC	"_"	1		Release:	ESC	"_"	0
Dec.:		27	45	1			27	45	0
Hex.:		1B	2D	01			1B	2D	00

Comments:

- Bit image data, spaces set by the HT code and IBM Graphic characters are not underlined.
- Pin No. 24 of the printhead is used for underlining.

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OVERLINING:

Sets continuous overlining of characters.

Name:	Set:	ESC	"_"	1		Release:	ESC	"_"	0
Dec.:		27	95	1			27	95	0
Hex.:		1B	5F	01			1B	5F	00

Comments:

- Bit image data, spaces set by the HT code, IBM graphic characters are not overlined.
- Pin No. 1 of the printhead is used for overlining.

IBM CHARACTER SET I:

Selects IBM Proprinter XL24E Character Set 1.

Name:	ESC	"7"
Dec.:	27	55
Hex.:	1B	37

Comments:

- Refer to Appendix A.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

IBM CHARACTER SET II:

Selects IBM Proprinter XL24E Character Set 2.

Name: ESC “6”
Dec.: 27 54
Hex.: 1B 36

Comments:

- Refer to Appendix A.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

SETS CODE PAGE

Changes the current code page.

Name: ESC “[” “T” n₁ n₂ n₃ n₄ n₅ n₆
Dec.: 27 91 84 n₁ n₂ n₃ n₄ n₅ n₆
Hex.: 1B 5B 54 n₁ n₂ n₃ n₄ n₅ n₆

Comments:

- This command is ignored if an unavailable code page is specified.
- The values of n₁ n₂ n₃ and n₄ can be used.
n₁=4
n₂=n₃=n₄=0
- The values of n₅ and n₆ select the code pages as follows:
n₅=00_H, n₆=00_H: Current
n₅=01_H, n₆=B5_H: U.S. character set
n₅=03_H, n₆=52_H: Multilingual character set
Except the above: Downloaded font
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
- Refer to Appendix A.

IBM Proprinter XL24E Mode Commands

8-PIN STANDARD DENSITY GRAPHICS:

Sets standard density graphic mode [60 dots per inch (25.4 mm)/816 dots per line]. (For detailed information, refer to Section 5.3.)

Name:	ESC	"K"	n1	n2	Data
Dec.:	27	75	n1	n2	Data
Hex.:	1B	4B	n1	n2	Data

8-PIN DOUBLE DENSITY GRAPHICS:

Sets double density graphic mode [120 dots per inch (25.4 mm)/1632 dots per line]. (For detailed information, refer to Section 5.3.)

Name:	ESC	"L"	n1	n2	Data
Dec.:	27	76	n1	n2	Data
Hex.:	1B	4C	n1	n2	Data

DOUBLE SPEED, DOUBLE DENSITY GRAPHICS:

Sets double speed, double density graphics mode [120 dots per inch (25.4 mm)/1632 dots per line]. (For detailed information, refer to Section 5.3.)

Name:	ESC	"Y"	n1	n2	Data
Dec.:	27	89	n1	n2	Data
Hex.:	1B	59	n1	n2	Data

Comment:

- Horizontal adjacent dots cannot be printed.

IBM Proprinter XL24E Mode Commands

8-PIN QUADRUPLE DENSITY GRAPHICS:

Sets quadruple density graphics mode [240 dots per inch (25.4 mm)/3264 dots per line]. (For detailed information, refer to Section 5.3.)

Name: ESC "Z" n₁ n₂ Data
Dec.: 27 90 n₁ n₂ Data
Hex.: 1B 5A n₁ n₂ Data

Comment:

- Horizontal adjacent dots cannot be printed.

BIT IMAGE MODE SELECTION (AGM):

Selects one of the 8-pin and 24-pin bit image graphic modes (AGM only).

Name: ESC "*" m n₁ n₂ Data
(m=0, 1, 2, 3, 4, 6, 32, 33, 38, 39, 40)
Dec.: 27 42 m n₁ n₂ Data
Hex.: 1B 2A m n₁ n₂ Data

Comments:

- The following table illustrates the various modes based upon the values of m.

m	Pin	Dots/Inch	Dots/Line	
0	8	60	816	Standard Density
1	8	120	1632	Double Density
2	8	120	1632	Double Speed, Double Density
3	8	240	3264	Quadruple Density
4	8	80	1088	CRT I
6	8	90	1224	CRT II
32	24	60	816	Standard Density
33	24	120	1632	Double Density
38	24	90	1224	CRT III
39	24	180	2448	Triple Density
40	24	360	4896	Hex Density

- When m=2, 3, 40, horizontal adjacent dots cannot be printed.
- This command is effective only when AGM mode is set to ON through the Function mode (see pages 3-26, 5-21).

IBM Proprinter XL24E Mode Commands

BIT IMAGE MODE SELECTION:

Selects one of the 8-pin or 24-pin bit image graphic modes.

Name: ESC “[” “g” n₁ n₂ m Data
(m=0, 1, 2, 3, 8, 9, 11, 12)
Dec.: 27 91 103 n₁ n₂ m Data
Hex.: 1B 5B 67 n₁ n₂ m Data

Comments:

- The following table illustrates the various modes based upon the values of m.

m	Pin	Dots/Inch	Dots/Line	
0	8	60	816	Standard Density
1	8	120	1632	Double Density
2	8	120	1632	Double Speed, Double Density
3	8	240	3264	Quadruple Density
8	24	60	816	Standard Density
9	24	120	1632	Double Density
11	24	180	2448	Triple Density
12	24	360	4896	Hex Density

- When m=2, 3, 12, horizontal adjacent dots cannot be printed (see Section 5.3).

1/8 INCH PAPER FEED:

Sets paper feed amount to 1/8 inch (3.2 mm).

Name: ESC “0”
Dec.: 27 48
Hex.: 1B 30

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

7/2 INCH PAPER FEED:

Sets paper feed amount to 7/2 inch (2.5 mm).

Name:	ESC	"1"
Dec.:	27	49
Hex.:	1B	31

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

LINE SPACING:

Executes line spacing set by ESC+"A"+n.

Name:	ESC	"2"
Dec.:	27	50
Hex.:	1B	32

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

7/2 INCH PAPER FEED SELECTION:

Sets programmable paper feed amount to 7/2 inch.

Name:	ESC	"A"	n
Dec.:	27	65	n
Hex.:	1B	41	n

Comments:

- ESC+"2" must be input after ESC+"A"+n for 7/2 inch paper feed to become effective (when AGM is set to OFF only).
- 7/2 inch paper feed is valid for $0 \leq n \leq 255$.
- The IBM Proprinter XL24E mode defaults to 1/6 inch.
- In the AGM mode, this command sets one line paper feed of 7/60 inch (see pages 3-26, 5-21).
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

$\frac{1}{2}$ 16 INCH PAPER FEED:

Sets programmable paper feed amount to $\frac{1}{2}$ 16 inch.

Name:	ESC	"3"	n
Dec.:	27	51	n
Hex.:	1B	33	n

Comments:

- $\frac{1}{2}$ 16 inch paper feed is valid for $0 \leq n \leq 255$.
- The paper feed amount is not exactly $\frac{1}{2}$ 16 inch, for the minimum unit is $\frac{1}{360}$ inch.
- This command sets one line paper feed of $\frac{1}{180}$ inch in the AGM mode (see pages 3-26, 5-21).
- PANEL LOCK in the Function mode affects this command. (See pages 3-19, 3-20.)

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LINE FEED PITCH SELECTION:

Selects line base unit for ESC+"3" and ESC+"J".

Name:	ESC	"["	"\"	n ₁	n ₂	n ₃	n ₄	n ₅	n ₆
Dec.:	27	91	92	n ₁	n ₂	n ₃	n ₄	n ₅	n ₆
Hex.:	1B	5B	5C	n ₁	n ₂	n ₃	n ₄	n ₅	n ₆

Comments:

- The values of n₁, n₂, n₃, n₄ and n₅ must be used as follows:
n₁=4
n₂=n₃=n₄=n₅=0
- The value of n₆ selects the base line feed unit for ESC+"3" and ESC+"J".

	Base unit
n ₆ =180	$\frac{1}{180}$ inch
n ₆ =216	$\frac{1}{216}$ inch

- Other values of n₆ are unsupported.

IBM Proprinter XL24E Mode Commands

AUTOMATIC LINE FEED MODE:

Automatically executes a Line Feed following a Carriage Return.

Name:	Set:	ESC	"5"	1	Release:	ESC	"5"	0
Dec.:		27	53	1		27	53	0
Hex.:		1B	35	01		1B	35	00

Comment:

- **PANEL LOCK** in the Function mode affects this command.
(See pages 3-19, 3-20.)
-

LINE FEED (LF):

Causes data in line buffer to be printed and then executes a single line feed.

Name:	LF
Dec.:	10
Hex.:	0A

Comments:

- When the new line position falls within the skip perforation area, the paper advances to the next top of form position.
- If there is no data, "space" data (ASCII 32), or blanks between HT print positions in the line buffer, LF feeds the paper by 1 line.
- The amount of spacing generated by LF is a function of the paper feed amount setting.
- LF code releases single-line double width printing set by SO and ESC+SO.
- Function mode controls the Automatic CR function. When this mode is set to OFF, LF executes a single line feed; with no carriage movement. When this mode is set to ON, a Carriage Return command (CR) is added to each Line Feed (LF).

IBM Proprinter XL24E Mode Commands

FORM FEED (FF):

Feeds paper to next top of form position after first printing any data in the line buffer.

Name: FF
Dec.: 12
Hex.: 0C

Comments:

- FF releases single-line double width printing set by SO or ESC+SO.
- Amount of form feed depends upon the page length set by the page length control command or the EZ Set Operator panel.

7

$\frac{1}{2}$ INCH PAPER FEED SELECTION:

Prints out the data in the line buffer and feeds the paper $\frac{1}{2}$ inch or $\frac{1}{80}$ inch.

Name: ESC "J" n
Dec.: 27 74 n
Hex.: 1B 4A n

Comments:

- When Automatic CR is set to ON through the Function mode, Carriage Return command (CR) is added automatically to this command.
- The value of n is valid for $0 \leq n \leq 255$.
- This command sets the paper feed for one line only. Subsequent paper feed returns to previous setting. However, the carriage does not return to the left margin position. Instead, printing of next line begins where previous printing left off.
- This command does not release single-line double width printing.
- The paper feed amount is not exactly $\frac{1}{2}$ inch, for the minimum unit is $\frac{1}{360}$ inch.
- In the AGM mode, this command sets one line paper feed of $\frac{1}{80}$ inch (see pages 3-26, 5-21).

IBM Proprinter XL24E Mode Commands

PAGE LENGTH (INCHES):

Sets page length in inches.

Name:	ESC	"C"	0	n
Dec.:	27	67	0	n
Hex.:	1B	43	00	n

Comments:

- Upon receipt of ESC+"C"+0+n, the present line position becomes the top of page position.
- The value of n must be in the range $1 \leq n \leq 255$.
- ESC+"C"+0+n releases the skip perforation settings.
- The page length does not change even if the paper feed amount is changed.
- The terms "form" and "page" are interchangeable.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

PAGE LENGTH (LINES):

Sets page length in number of lines.

Name:	ESC	"C"	n
Dec.:	27	67	n
Hex.:	1B	43	n

Comments:

- Upon receipt of ESC+"C"+n, the present line position becomes the top of page position.
- The value of n must be in the range $1 \leq n \leq 255$. If n=0, page length returns to the inch designation.
- ESC+"C"+n releases the skip perforation settings.
- The page length does not change even if the paper feed amount is changed.
- The terms "form" and "page" are interchangeable.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

MARGIN SET:

Sets positions of left and right margins.

Name:	ESC "X"	n ₁	n ₂
Dec.:	27 88	n ₁	n ₂
Hex.:	1B 58	n ₁	n ₂

Comments:

- The left margin column is set to n₁ in the current width, and the right margin column is set to n₂.
- Any right margin designation to the left of the left margin position is ignored.
- Setting the margin clears all data in the line buffer.
- Once the margin position is set, a change in the pitch will not alter this margin setting.
- When n₁=0, the left margin does not change. When n₂=0, the right margin does not change.
- Permissible values of n₁, n₂ are given below.

8" print line

Pica print	$1 \leq n_1 \leq 78$	$3 \leq n_2 \leq 80$
Elite print	$1 \leq n_1 \leq 93$	$4 \leq n_2 \leq 96$
Compressed print	$1 \leq n_1 \leq 133$	$5 \leq n_2 \leq 137$

13.6" print line

Pica print	$1 \leq n_1 \leq 134$	$3 \leq n_2 \leq 136$
Elite print	$1 \leq n_1 \leq 160$	$4 \leq n_2 \leq 163$
Compressed print	$1 \leq n_1 \leq 229$	$5 \leq n_2 \leq 233$

- **PANEL LOCK** in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

SKIP PERFORATION:

Sets skip perforation.

Name:	Set:	ESC	"N"	n	Release:	ESC	"O"
Dec.:		27	78	n		27	79
Hex.:		1B	4E	n		1B	4F

Comments:

- The value of n specifies the number of lines (or n times the current line spacing amount) to be skipped at the bottom of the page.
- This command is effective only for $0 \leq n \leq 255$.
- The skip perforation amount does not change even if the paper feed amount is changed following a skip perforation designation.
- The skip perforation is released upon receipt of the page length designation command.
- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)
- The skip perforation command overrides the front panel Bottom margin setting.

TOP OF FORM:

Sets top of form.

Name:	ESC	"4"
Dec.:	27	52
Hex.:	1B	34

Comment:

- This command sets the current paper position as the top of form.

IBM Proprinter XL24E Mode Commands

HORIZONTAL TAB STOP SETTING:

Sets horizontal tabulations to specified values.

Name:	Set:	ESC	"D"	n ₁	n ₂ ...n _x	0	Release:	ESC	"D"	0
Dec.:		27	68	n ₁	n ₂ ...n _x	0		27	68	0
Hex.:		1B	44	n ₁	n ₂ ...n _x	00		1B	44	00

Comments:

- Horizontal tabs are set from the left margin position.
- Horizontal tabs must be designated such that $n_1 < n_2 < \dots < n_x$.
- A maximum of 32 tabs may be set on a single line.
- ESC + "D" + $n_1 + n_2 + \dots + n_x + 0$ sets horizontal tab stops. The HT command executes the tab designation.
- In proportional spacing, horizontal tabs are set based on 10 cpi.
- If the character pitch is altered after designation of horizontal tabs, the tab positions change.
- When the left margin is changed, horizontal tabs will be moved based on the new margin setting.
- When the printer is powered up, tabs are automatically set every 8 characters.

HORIZONTAL TAB EXECUTION:

Executes the horizontal TAB as designated by ESC + "D" + $n_1 + n_2 + \dots + n_x + 0$.

Name:	HT
Dec.:	9
Hex.:	09

Comments:

- If the value of the horizontal TAB is less than the present column position, that HT is ignored.
- When in underline mode, the blank spaces between consecutive HT print positions are not underlined.

IBM Proprinter XL24E Mode Commands

VERTICAL TAB STOP SETTING:

Sets vertical tabulation to specified values.

Name:	Set:	ESC	"B"	n ₁	n ₂ ...n _x	0	Release:	ESC	"B"	0
Dec.:		27	66	n ₁	n ₂ ...n _x	0		27	66	0
Hex.:		1B	42	n ₁	n ₂ ...n _x	00		1B	42	00

Comments:

- VT is set from the top of page position.
- Vertical tabs must be designed such that $n_1 < n_2 \dots < n_x$.
- ESC+"B"+n₁+n₂+...+n_x+0 sets vertical tab stops. The VT command executes the tab designation.
- If the paper feed amount is changed after a designation of vertical tabs, the tab positions do not change.
- A maximum of 64 tabs may be set.

VERTICAL TAB EXECUTION:

Executes the vertical TAB as designated by ESC+"B"+n₁+n₂+...+n_x+0.

Name:	VT
Dec.:	11
Hex.:	0B

Comments:

- When TABs are set with VT setting command and there is no tab setting on a position exceeding the present line, data is printed out and advances the paper one line (same as LF).
- When vertical TAB has not been set by ESC+"B"+n₁+n₂+...+n_x+0, execution of VT causes data in the line buffer to be printed and advances the paper one line (same function as LF).

IBM Proprinter XL24E Mode Commands

ALL TAB INITIAL CLEAR:

Sets all tabs to power ON settings.

Name: ESC "R"
Dec.: 27 82
Hex.: 1B 52

Comment:

- This command sets horizontal tabs at every 8th position and clears all vertical tabs.
-

7

BACKSPACE:

Prints data in line buffer and backspaces one space before printing next character.

Name: BS
Dec.: 8
Hex.: 08

Comment:

- Since BS backspaces the width of a character, the backspacing amount will depend upon the character mode set when the BS code is executed.

IBM Proprinter XL24E Mode Commands

CARRIAGE RETURN:

Prints all data in line buffer and designates that the next line starts at the left margin.

Name: CR
Dec.: 13
Hex.: 0D

Comments:

- Certain computers issue an automatic line feed with a carriage return. Check your computer manual for details.
- When auto LF is set to ON through the Function mode, the paper is fed automatically (a LF is executed automatically) whenever a CR code is executed.
- CR code releases single line double width printing set by SO or ESC+SO.

SINGLE DIRECTION:

Sets single direction (left to right) printing mode.

Name:	Set:	ESC	"U"	1		Release:	ESC	"U"	0
Dec.:		27	85	1			27	85	0
Hex.:		1B	55	01			1B	55	00

Comment:

- PANEL LOCK in the Function mode affects this command.
(See pages 3-19, 3-20.)

IBM Proprinter XL24E Mode Commands

RELATIVE HORIZONTAL POSITION:

Moves the printhead toward the right $\frac{1}{120}$ inch.

Name:	ESC “d”	n ₁	n ₂
Dec.:	27 100	n ₁	n ₂
Hex.:	1B 64	n ₁	n ₂

Comments:

- When underlining or overlining, spaces created by the move are underlined or overlined.
- This command moves the printhead to a position $n_1 + (256 \times n_2)$ units from the current position. Each unit equals $\frac{1}{120}$ of an inch.

7

CANCEL:

Clears all data in the line buffer.

Name:	CAN
Dec.:	24
Hex.:	18

REMOTE PRINTER SELECT:

Selects the printer remotely, enabling it to receive data.

Name:	DC1	(Device Control 1)
Dec.:	17	
Hex.:	11	

Comments:

- Receipt of DC1 while the printer is deselected by ESC+“Q”+35 enables the printer to receive data.
- The data received between ESC+“Q”+35 and DC1 is lost.

IBM Proprinter XL24E Mode Commands

REMOTE DESELECT PRINTER:

Deselects the printer remotely, disabling it from receiving data.

Name:	ESC	"Q"	35
Dec.:	27	81	35
Hex.:	1B	51	23

Comment:

- All data sent in deselect status becomes invalid. In order to return to select status, send DC1 code.
-

FONT DOWNLOADING:

Defines download characters into specified address locations in RAM.

Name:	ESC	"="	n ₁	n ₂	35	A ₁	A ₂	Data
Dec.:	27	61	n ₁	n ₂	35	A ₁	A ₂	Data
Hex.:	1B	3D	n ₁	n ₂	23	A ₁	A ₂	Data

Comments:

- This command is operational only when the 32K buffer option (KX-P43) is installed.
 - When n₁=n₂=0, download characters are all cleared.
 - Refer to Section 5.2 on page 5-4 for detailed information.
-

BELL:

Sounds the buzzer for approximately 0.5 second.

Name:	BEL
Dec.:	7
Hex.:	07

IBM Proprinter XL24E Mode Commands

ESCAPE:

First byte of each multi byte printer control code.

Name: ESC
Dec.: 27
Hex.: 1B

Comment:

- Cannot be generated by the ESC key on certain computers.
-

7

NULL:

Last byte of certain multi-byte printer control codes.

Name: NUL
Dec.: 0
Hex.: 00

ALL CHARACTER CHART PRINTING (Continuous):

Prints continuously from All Character Chart.

Name: ESC“\” n₁ n₂
Dec.: 27 92 n₁ n₂
Hex.: 1B 5C n₁ n₂

Comments:

- This command allows the printing of all characters including characters with an ASCII value below decimal 32.
- Refer to IBM All Character Chart (Appendix A).
- The values specified for n₁ and n₂ indicate how many characters to print from All Character Chart, calculating the total count with this formula; Total count = n₂ × 256 + n₁.
- The data following this command and designated by n₁ and n₂, will be printed as characters from the All Character Chart.

IBM Proprinter XL24E Mode Commands

All CHARACTER CHART PRINTING (Single):

Prints single character from All Character Chart.

Name: ESC “^”
Dec.: 27 94
Hex.: 1B 5E

Comments:

- Only the character following this command will be printed.
 - Refer to IBM All Character Chart (Appendix A).
-

SETS OFF LINE MODE:

Stops printing and goes to OFF LINE mode.

Name: ESC “j”
Dec.: 27 106
Hex.: 1B 6A

Comment:

- When you desire to print again, press the ON LINE switch.
-

INITIAL STATE:

Resets to initial state.

Name:	ESC “{” “K”	n_1	n_2	m	35	p_1	p_2
		($n_1=1, 3, 4$) ($n_2=0$)					
Dec.:	27 91 75	n_1	n_2	m	35	p_1	p_2
Hex.:	1B 5B 4B	n_1	n_2	m	23	p_1	p_2

Comments:

- The following values of n_1 can be used.
 - $n_1=1$: Initialize only
 - $n_1=3$: Initialize and set by p_1
 - $n_1=4$: Initialize and set by p_1 and p_2

IBM Proprinter XL24E Mode Commands

- The following table illustrates the various modes based upon the value of m.

m	Initialization	Download	
0	Current MACRO	Not cleared	Not saved
1	Current MACRO	Cleared	Not saved
4	FACTORY setting	Cleared	Not saved
5	FACTORY setting	Cleared	Not saved
254	Current MACRO	Cleared	Saved
255	FACTORY setting	Cleared	Saved

- The following tables illustrate the parameter specifications.
p₁ (Parameter 1):

Bit		OFF	ON
7	Discard byte	Process this byte	Ignore this byte
6	Not used		
5	Paper out alarm	Enable	Disable
4	Auto CR	OFF	ON
3	Auto LF	OFF	ON
2	Form length	11"	12"
1	Zero slash	Normal	Slashed Zero
0	Character set	Set 1	Set 2

- p₂ (Parameter 2):

Bit		OFF	ON
7	Discard byte	Process this byte	Ignore this byte
6	Select code page	USA	Multilingual
5	Not used	—	—
4	Not used	—	—
3	Not used	—	—
2	Not used	—	—
1	Print width	13.6"	8"
0	Cut sheet feeder	Disable	Enable

8. Interfacing

Parallel Interfacing

Communication with a computer is accomplished through a parallel interface based on the Centronics standard.

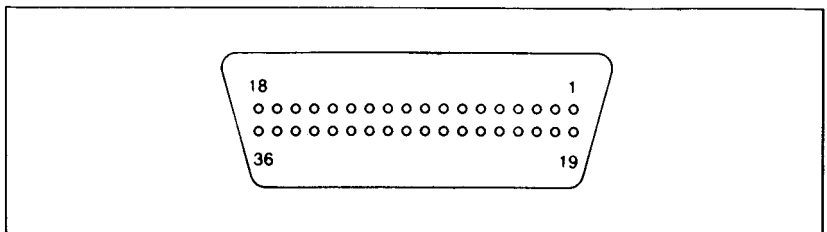
Specifications:

- data transfer speed: 1000 cps minimum
- synchronization: external STROBE pulse
- logic levels: TTL
- handshaking: BUSY and $\overline{\text{ACK}}$ signals
- connector type: 57-30360 (AMPHENOL) or equivalent
- cable: use a shielded cable (6'5"/1.95 meters) or less in length.

When the printer is processing data, the BUSY signal is high. The printer will not accept new data from the computer. After the processing is completed, the BUSY signal goes low. (The BUSY signal is also high when the printer is OFF LINE). When the busy signal occurs, the $\overline{\text{ACK}}$ signal goes low indicating to the computer that the data has been processed and the printer is ready to accept more data. This handshaking routine occurs each time a character is sent to the printer.

	BUSY	SLCT	PO	$\overline{\text{ERROR}}$
ON LINE	LOW	HIGH	LOW	HIGH
OFF LINE	HIGH	LOW	LOW	LOW
PAPER OUT	HIGH	LOW	HIGH	LOW

Printer Status signals



Parallel Interface Connector (Printer side)

Interfacing

8

Signal pin	Return side pin	Signal	Direction
1	19	STB	Input
2	20	DATA 1	Input
3	21	DATA 2	
4	22	DATA 3	
5	23	DATA 4	
6	24	DATA 5	
7	25	DATA 6	
8	26	DATA 7	
9	27	DATA 8	
10	28	ACK	Output
11	29	BUSY	Output
12		PO	Output
13		SLCT	Output
14		AUTO FEED XT	Input
15			
16		SG	
17		FG	
28		+5 V	Output
31	30	PRIME	Input
32		ERROR	Output
33		SG	
34			
35			
36			

Pin Configuration (Parallel)

Note:

- “INPUT” refers to a signal coming into the printer. “OUTPUT” denotes a signal exiting the printer.
- “RETURN” denotes the return side wire of a twisted pair cable and is connected to signal ground.
- All interface signals are at TTL (Transistor-Transistor-Logic) levels.

Connector pin signals

STB...STROBE

- This is a synchronizing input signal to read data into the printer.
- This signal is normally high. Data is read in when it goes low.
- The pulse must be low for at least 1 microsecond.

DATA 1–DATA8

- These are the input signals which carry the 8 data bits of information.
- The signal is read in synchronization with the STROBE pulse. A high level indicates a logical “1”.
- The signal must be present 0.5 microsecond before and after the STROBE pulse.

ACK...ACKNOWLEDGE

- This is an output signal to the computer indicating that the printer is ready to receive the next block of data. It is sent out when the BUSY signal drops from high to low. Therefore, it can be thought of as a data request pulse.
- The signal is normally high. When the condition becomes true, the signal goes low.
- The ACK signal is automatically sent whenever the printer is switched ON LINE.

BUSY

- This output signal indicates the status of the printer. The signal is high when the printer is busy and cannot receive data.
- The signal is high under the following conditions:
 1. receive buffer full
 2. printer is processing data
 3. printer is OFF LINE
 4. printer is in an error condition

PO...PAPER OUT

- This output signal indicates that paper out detector detects the absence of paper.
- The signal is normally low and goes high during a “Paper Out” condition.

SLCT...SELECT

- SELECT is an output signal which indicates the ON LINE or OFF LINE state of the printer. The signal is high in the ON LINE state and low when OFF LINE.
- The printer enters the ON LINE state:
 1. when the printer is turned on
 2. when PRIME is received
 3. when the RESET command is received
 4. when the ON LINE switch is pressed
- The printer enters the OFF LINE state:
 1. when the printer is out of paper
 2. when the printer is switched OFF LINE
 3. when the printer's cover is open

AUTO FEED XT ($\overline{\text{AFXT}}$)

- This input signal determines if a line feed (LF) command will be added to each carriage return (CR).
- When $\overline{\text{AFXT}}$ is low, CR+LF action occurs. When $\overline{\text{AFXT}}$ is high, only a carriage return is performed.
- Auto LF setting in the Function mode can alter the response by the printer to an $\overline{\text{AFXT}}$ signal. If auto LF is ON, the printer will perform a CR+LF regardless of the level of the incoming signal. When auto LF is OFF, this automatic action is disabled.

SG...SIGNAL GROUND

- The twisted pair return wires (pins 19–30) are connected to signal ground.

FG...FRAME GROUND

- Frame ground is the same as chassis ground.

+5 V

- This is for evaluation only. It should not be used to supply power for external equipment.

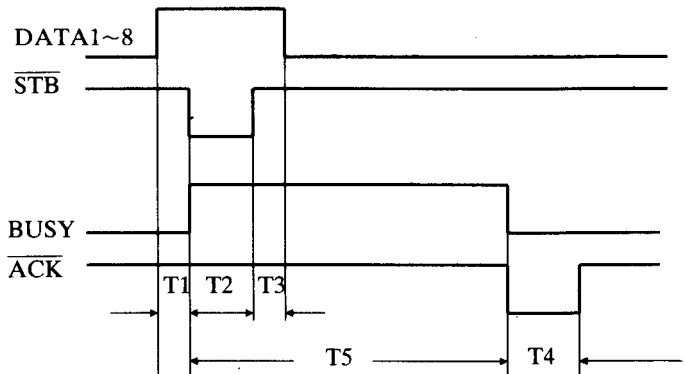
PRIME

- This input signal is used to initialize the printer. The signal is normally high and goes low to reset the printer. It can be received anytime during printer operation.

ERROR

- This output signal is an “error” or “fault” condition. Normally high, this signal goes low when an error occurs. An error condition can be caused by:
 1. a “Paper Out” condition
 2. the printer is OFF LINE
 3. an overload condition exists
 4. a cover open condition exists

Timing Chart (When normal printing code is received)



- T1.... 0.5 μ s (Min)
- T2.... 1 μ s (Min)
- T3.... 0.5 μ s (Min)
- T4.... 5 μ s (Max)
- T5.... 1 ms or less when buffer is not full
1 s or less when buffer is full

Timing Diagram

9. Maintenance

The printer does not require any routine maintenance. However, reasonable care of the printer will extend its life. The following precautions and periodic measures are recommended:

Precautions

- Keep all liquids away from the printer. Accidental spillage of a liquid into the printer can cause severe damage.
- Do not block the air flow around the printer. Do not place books, paper, or other items on top of the printer.
- Special care should be taken to protect the printer if it is used in an unfriendly environment such as a machine shop, a dusty or sandy area, etc.
- The life of the printhead can be extended by observing a few simple precautions.
 - Do not operate the printer without paper and a ribbon cassette installed.
 - Avoid prolonged use without allowing the printhead time to cool.
 - Do not obstruct the movement of the printhead while in operation.
- If the printer is not going to be used for an extended period, unplug the power cord.

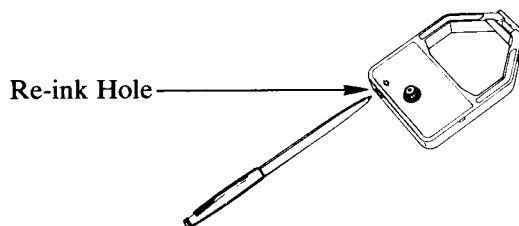
Periodic Maintenance

- Cleaning the unit is the most important action the user can perform. The frequency of cleaning is dependent upon the environment.
 - Turn the power OFF.
 - Clean the case and covers with a soft cloth. Use any mild commercial cleaner on the cloth, do not spray directly on the printer.

- Open the top and the smoked plastic covers. Vacuum or dust the inside area of the unit. Be very careful not to damage the flex ribbon cable and the carriage drive belt.
- The platen should be cleaned with denatured alcohol only.
- The carriage guide bar can be lubricated with a very light oil. Contact your Authorized Panasonic Service Center for advice on lubrication.

Ribbon Cassette

A single ribbon permits the printing of about 3 million characters. When the printing starts to fade, gently push the counter spring in the ribbon cassette hole with the tip of a ballpoint pen or other object. **Once the ribbon cassette is mounted onto the carriage and printing is performed for a short time, the characters will become darker.**



Note:

- Do not re-ink the ribbon before printing starts to fade. If the ribbon has too much ink the characters may smear when printed.
- Wear and tear of the printhead pins may cause serious damage to the ribbon and cause the printing to fade. In such cases the printer needs servicing.

Troubleshooting

Most problems associated with the printer can be traced to improper setup, installation, or cabling. The error messages shown on the display (see Table 9.2) and the following table will assist the user in identifying and correcting some of the more common problems. If you need additional help, contact the store from which the unit was purchased.

Maintenance







Symptom	Possible Cause	Probable Solution
Printer does not power up	No AC power	Check power cord
Power on but printer not printing	Printer not ON LINE Interface cable not connected	Press ON LINE switch Secure connection
Printer won't go ON LINE	Out of Paper	Replace paper
Paper out sensor inoperative	*P.O.DETECT is OFF	*Set P.O.DETECT to ON
Paper slips around platen	Paper feed selector in “  PUSH” or “  PULL” position	Set selector to “  ” position
Head moves but does not print	Ribbon not installed correctly	Re-insert ribbon
Paper wrinkles when using tractor feed	No reverse tension on paper Selector switch is in “  ” position	Set paper supply lower than printer Set selector to “  PUSH” or “  PULL” position
Cannot change form length	*CSF is ON	*Set CSF to OFF
Print out is double-spaced	*Auto LF is ON	*Set Auto LF to OFF
Cannot print ASCII characters with code above 127	*D.LENGTH is set incorrectly	*Set D.LENGTH as required
Wrong character set printed	*Wrong character set selected	*Set the character set as required
Cannot change print style from computer	*FONT and PITCH modes are set incorrectly	*Set PANEL LOCK to OFF

Table 9.1 Troubleshooting (* in the Function mode. See page 3-10.)

Error Messages	Possible cause	Probable Solution
CAN'T LOAD MACRO	Printer can't load a MACRO in Hex. Dump mode	Power off then on
	Some data remains in printer	Press ON LINE switch to print out remaining data
CAN'T PRINT OUT	Some data remains and printer can't output	With paper installed press ON LINE switch to print out remaining data
CAN'T SET MARGIN	Margins are set incorrectly	Set margins correctly
PAPER OUT	Paper is not installed or loaded under platen	Install paper or load paper by pulling the paper bail release lever
OVERLOAD	Path of printhead is blocked	Eliminate the blockage Power off then on to resume printing
PRINTHEAD HOT	Printhead is overheated and printer pauses until head temperature decreases	Automatic recovery
PAPER JAM	Paper is jammed	Open printer covers and remove jammed paper
NO REV LF/PULL	*REV LF/PULL is OFF	*Set REV LF/PULL ON
CAN'T BACK PAPER	Printer can't back paper past printable area	Do not back paper past printable area
TOP MARGIN	Printer can't back paper past top margin (only when a top margin is set)	Do not back paper past top margin or reset top margin to 0
CAN'T SET TOF	Printer can't set top of form	Check your paper installation
EEPROM ERROR	EEP ROM chip is out of order	Contact a local Authorized Service
RAM ERROR	RAM chip is out of order	

Table 9.2 Error messages (* in the Function mode. See page 3-10.)









































Appendix A

Epson LQ-1050 Italic Character Set

Dec.	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0	NUL		SP	0	@	P	'	p		SP	0	@	P	'	p	
1	1		DC1	!	1	A	Q	a	q		DC1	!	1	A	Q	a	q
2	2		DC2	"	2	B	R	b	r		DC2	"	2	B	R	b	r
3	3		DC3	#	3	C	S	c	s		DC3	#	3	C	S	c	s
4	4		DC4	\$	4	D	T	d	t		DC4	\$	4	D	T	d	t
5	5			%	5	E	U	e	u			%	5	E	U	e	u
6	6			&	6	F	V	f	v			&	6	F	V	f	v
7	7	BEL		'	7	G	W	g	w	BEL		'	7	G	W	g	w
8	8	BS	CAN	(	8	H	X	h	x	BS	CAN	(	8	H	X	h	x
9	9	HT	EM	)	9	I	Y	i	y	HT	EM	)	9	I	Y	i	y
10	A	LF		*	:	J	Z	j	z	LF		*	:	J	Z	j	z
11	B	VT	ESC	+	;	K	[	k	{	VT	ESC	+	;	K	[	k	{
12	C	FF		,	<	L	\	l	|	FF		,	<	L	\	l	|
13	D	CR		-	=	M	]	m	}	CR		-	=	M	]	m	}
14	E	SO		.	>	N	^	n	~	SO		.	>	N	^	n	~
15	F	SI		/	?	O	_	o	DEL	SI		/	?	O	_	o	

A

Epson LQ-1050 Graphic Character Set 1

Dec.	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0	NUL		SP	0	@	P	'	p		á				α	≡	
1	1		DC1	!	1	A	Q	a	q		í				β	±	
2	2		DC2	"	2	B	R	b	r		ó				Γ	≥	
3	3		DC3	#	3	C	S	c	s		ú				π	≤	
4	4		DC4	\$	4	D	T	d	t		ñ				Σ		
5	5		§	%	5	E	U	e	u		Ñ				σ		
6	6			&	6	F	V	f	v		<u>a</u>				μ	÷	
7	7	BEL		'	7	G	W	g	w	BEL	<u>o</u>				τ	≈	
8	8	BS	CAN	(	8	H	X	h	x	BS	CAN	¿			Φ	°
9	9	HT	EM	)	9	I	Y	i	y	HT	EM				θ	•
10	A	LF		*	:	J	Z	j	z	LF					Ω	•	
11	B	VT	ESC	+	;	K	[k	{	VT	ESC	$\frac{1}{2}$				δ	√
12	C	FF		,	<	L	\	l	|	FF		$\frac{1}{4}$				∞	"
13	D	CR		-	=	M]	m	}	CR		i				ø	²
14	E	SO		.	>	N	^	n	`	SO		<<				€	■
15	F	SI		/	?	O	_	o	DEL	SI		>>				∩	SP

Appendix A

Epson LQ-1050 Graphic Character Set 2

Dec.	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0	NUL		SP	0	@	P	'	p	Ç	É	á		L	ll	α	≡
1	1		DC1	!	1	A	Q	a	q	ü	æ	í		┌	┐	β	±
2	2		DC2	"	2	B	R	b	r	é	Æ	ó		└	┘	Γ	≥
3	3		DC3	#	3	C	S	c	s	â	ô	ú		┐	┘	π	≤
4	4		DC4	\$	4	D	T	d	t	ä	ö	ñ		┐	┘	Σ	∫
5	5		§	%	5	E	U	e	u	à	ò	Ñ		┐	┘	σ	∫
6	6			&	6	F	V	f	v	â	û	ä		┐	┘	μ	÷
7	7	BEL		'	7	G	W	g	w	ç	ù	ö		┐	┘	τ	≈
8	8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿		┐	┘	Φ	°
9	9	HT	EM	)	9	I	Y	i	y	ë	Ö	┐		┐	┘	θ	•
10	A	LF		*	:	J	Z	j	z	è	Ü	┐		┐	┘	Ω	•
11	B	VT	ESC	+	;	K	[	k	{	ï	¢	½		┐	┘	δ	√
12	C	FF		,	<	L	\	l	|	î	£	¼		┐	┘	∞	n
13	D	CR		-	=	M	]	m	}	ï	¥	ı		┐	┘	ø	²
14	E	SO		.	>	N	^	n	-	Ä	Pt	<<		┐	┘	€	■
15	F	SI		/	?	O	_	o	DEL	Å	f	>>		┐	┘	∩	SP

A

IBM Proprinter XL24E Character Set 1

Dec.	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	NUL		SP	0	@	P	.	p		á	⋮	⌞	⌚	α	≡
1	1		DC1	!	1	A	Q	a	q		í	⋈	⌞	⌚	β	±
2	2		DC2	"	2	B	R	b	r		ó	⋈	⌞	⌚	Γ	≥
3	3			#	3	C	S	c	s		ú	⌞	⌞	⌚	π	≤
4	4		DC4	\$	4	D	T	d	t		ñ	⌞	⌞	⌚	Σ	∫
5	5			%	5	E	U	e	u		Ñ	⌞	⌞	⌚	σ	∫
6	6			&	6	F	V	f	v		ä	⌞	⌞	⌚	μ	÷
7	7	BEL		'	7	G	W	g	w	BEL	ö	⌞	⌞	⌚	τ	≈
8	8	BS CAN	(	8	H	X	h	x	BS CAN	¿	⌞	⌞	⌚	Φ	°	
9	9	HT		)	9	I	Y	i	y	HT	⌞	⌞	⌚	⌞	θ	•
10	A	LF		*	:	J	Z	j	z	LF	⌞	⌞	⌚	⌞	Ω	•
11	B	VT ESC	+	;	K	[	k	{	VT ESC	½	⌞	⌞	⌚	⌞	δ	√
12	C	FF		,	<	L	\	|	FF	¼	⌞	⌞	⌚	⌞	∞	∞
13	D	CR		-	=	M	]	m	}	CR	ı	⌞	⌞	⌚	∅	²
14	E	SO		.	>	N	^	n	~	SO	<<	⌞	⌞	⌚	ε	■
15	F	SI		/	?	O	_	o		SI	>>	⌞	⌞	⌚	∩	SP










Appendix A

IBM Proprinter XL24E Character Set 2

Dec		0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	NUL		SP	0	@	P	`	p	Ç	É	á		L	⌌	α	≡
1	1		DC1	!	1	A	Q	a	q	ü	æ	í		⌌	⌌	β	±
2	2		DC2	"	2	B	R	b	r	é	Æ	ó		⌌	⌌	Γ	≥
3	3	♥		#	3	C	S	c	s	â	ô	ú		⌌	⌌	π	≤
4	4	♦	DC4	\$	4	D	T	d	t	ä	ö	ñ		⌌	⌌	Σ	
5	5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌌	⌌	⌌	σ	
6	6	♠		&	6	F	V	f	v	â	û	ä	⌌	⌌	⌌	μ	÷
7	7	BEL		'	7	G	W	g	w	ç	ù	ö	⌌	⌌	⌌	τ	≈
8	8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	⌌	⌌	⌌	Φ	°
9	9	HT		)	9	I	Y	i	y	ë	Ö	⌌	⌌	⌌	⌌	θ	•
10	A	LF		*	:	J	Z	j	z	è	Ü	⌌	⌌	⌌	⌌	Ω	•
11	B	VT	ESC	+	;	K	[	k	{	ï	¢	½	⌌	⌌		δ	√
12	C	FF		,	<	L	\	l	|	î	£	¼	⌌	⌌		∞	∞
13	D	CR		-	=	M	]	m	}	ì	¥	ì	⌌	⌌		ø	²
14	E	SO		.	>	N	^	n	~	Ä	Pts	<<	⌌	⌌		ε	■
15	F	SI		/	?	O	_	o		Å	f	>>	⌌	⌌		∩	SP





















A

IBM Proprinter XL24E All Character Chart

Dec.	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0	Ø	►	SP	0	@	P	`	p	Ç	É	á		L	⌌	α	≡
1	1	☉	◄	!	1	A	Q	a	q	ü	æ	í		⌌	⌌	β	±
2	2	●	↕	"	2	B	R	b	r	é	Æ	ó		⌌	⌌	Γ	≥
3	3	♥	!!	#	3	C	S	c	s	â	ô	ú		⌌	⌌	π	≤
4	4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	⌌	⌌	⌌	Σ	∫
5	5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌌	⌌	⌌	σ	∫
6	6	♠	-	&	6	F	V	f	v	å	û	ä	⌌	⌌	⌌	μ	÷
7	7	•	↕	'	7	G	W	g	w	ç	ù	ö	⌌	⌌	⌌	τ	≈
8	8	▣	↑	(	8	H	X	h	x	ê	ÿ	¿	⌌	⌌	⌌	Φ	°
9	9	○	↓	)	9	I	Y	i	y	ë	Ö	⌌	⌌	⌌	⌌	θ	•
10	A	▣	→	*	:	J	Z	j	z	è	Ü	⌌	⌌	⌌	⌌	Ω	•
11	B	♂	←	+	;	K	[	k	{	ï	¢	½	⌌	⌌		δ	√
12	C	♀	L	,	<	L	\	l	|	î	£	¼	⌌	⌌		∞	ˆ
13	D	♪	↔	-	=	M	]	m	}	ï	¥	ì	⌌	⌌		ø	²
14	E	♫	▲	.	>	N	^	n	˘	Ä	Pts	<<	⌌	⌌		ε	■
15	F	✱	▼	/	?	O	—	o	△	Å	f	>>	⌌	⌌		∩	SP

















Appendix A

IBM Character Set 1 Multilingual

Dec.	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0	NUL		SP	0	@	P	`	p			á		Ł	Œ	Ó	—
1	1		DC1	!	1	A	Q	a	q		DC1	í		Ł	Đ	ß	±
2	2		DC2	"	2	B	R	b	r		DC2	ó		Ł	Ê	Ô	—
3	3			#	3	C	S	c	s			ú		Ł	Ë	Ò	$\frac{3}{4}$
4	4		DC4	\$	4	D	T	d	t		DC4	ñ		Ł	È	ō	¶
5	5			%	5	E	U	e	u			Ñ	Á	Ł	ı	Õ	§
6	6			&	6	F	V	f	v			<u>a</u>	Â	ā	í	μ	÷
7	7	BEL		'	7	G	W	g	w	BEL		<u>o</u>	À	Ā	î	þ	,
8	8	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	©	Ł	ï	þ	°
9	9	HT		)	9	I	Y	i	y	HT		®			Ł	Ú	..
10	A	LF		*	:	J	Z	j	z	LF					Ł	Û	•
11	B	VT	ESC	+	;	K	[	k	{	VT	ESC	$\frac{1}{2}$				Ü	¹
12	C	FF		,	<	L	\	l	|	FF		$\frac{1}{4}$				Ý	³
13	D	CR		—	=	M	]	m	}	CR		ı	ç	=	ı	Ý	²
14	E	SO		.	>	N	^	n	~	SO		<<	¥		İ	-	
15	F	SI		/	?	O	_	o		SI		>>		α		'	SP

A

IBM Character Set 2 Multilingual

Dec.	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0	NUL		SP	0	@	P	`	p	Ç	É	á		Ł	ø	Ó	—
1	1		DC1	!	1	A	Q	a	q	ü	æ	í		┘	Đ	β	±
2	2		DC2	"	2	B	R	b	r	é	Æ	ó		┘	Ê	Ô	—
3	3	♥		#	3	C	S	c	s	â	ô	ú		┘	Ë	Ò	$\frac{3}{4}$
4	4	♦	DC4	\$	4	D	T	d	t	ä	ö	ñ	┘	—	È	õ	¶
5	5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	┘	ı	Õ	§
6	6	♠		&	6	F	V	f	v	å	û	<u>a</u>	Â	ā	í	μ	÷
7	7	BEL		'	7	G	W	g	w	ç	ù	<u>o</u>	À	Ã	î	þ	,
8	8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	©		ï	þ	°
9	9	HT		)	9	I	Y	i	y	ë	Ö	®			┘	Ú	"
10	A	LF		*	:	J	Z	j	z	è	Ü	┘			┘	Û	•
11	B	VT	ESC	+	;	K	[	k	{	ï	ø	$\frac{1}{2}$				Ü	¹
12	C	FF		,	<	L	\	l	|	î	£	$\frac{1}{4}$				ý	³
13	D	CR		-	=	M	]	m	}	ì	Ø	ì	ç	=	ı	Ý	²
14	E	SO		.	>	N	^	n	~	Ä	x	<<	¥		ı	-	■
15	F	SI		/	?	O	_	o		Å	f	>>	┘	α		'	SP

Appendix A

IBM All Character Chart Multilingual

Dec.		0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	Ø	►	SP	0	@	P	`	p	Ç	É	á		L	ø	Ó	—
1	1	⊙	◄	!	1	A	Q	a	q	ü	æ	í		┌	Ð	ß	±
2	2	●	↑	"	2	B	R	b	r	é	Æ	ó		└	Ê	Ô	—
3	3	♥	!!	#	3	C	S	c	s	â	ô	ú		└	Ë	Ò	¾
4	4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ		—	È	ö	¶
5	5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	├	ı	Ö	§
6	6	♠	-	&	6	F	V	f	v	å	û	ä	Â	ā	í	μ	÷
7	7	•	↓	'	7	G	W	g	w	ç	ù	ø	À	Ã	î	þ	,
8	8	▣	↑	(	8	H	X	h	x	ê	ÿ	ı	©	└	ï	þ	°
9	9	○	↓	)	9	I	Y	i	y	ë	Ö	®			└	Ú	ˆ
10	A	▣	→	*	:	J	Z	j	z	è	Ü				└	Ù	•
11	B	♂	←	+	;	K	[	k	{	ï	ø	½				Ù	ˆ
12	C	♀	L	,	<	L	\	l	|	î	£	¼				ý	³
13	D	♪	↔	-	=	M	]	m	}	ı	Ø	ı	¢	=	ı	Ý	²
14	E	ß	▲	.	>	N	^	n	˘	Ä	x	<<	¥		ı	˘	■
15	F	✱	▼	/	?	O	—	o	△	Å	f	>>	└	α		˘	SP



International Character Set

	n	35 _D 23 _H	36 _D 24 _H	64 _D 40 _H	91 _D 5B _H	92 _D 5C _H	93 _D 5D _H	94 _D 5E _H	96 _D 60 _H	123 _D 7B _H	124 _D 7C _H	125 _D 7D _H	126 _D 7E _H	155 _D 9B _H	157 _D 9D _H
USA	0	#	\$	@	[	\	\]	^	'	{	|	}	-	¢	¥
FRANCE	1	#	\$	à	°	ç	§	^	'	é	ù	è	¨	¢	¥
GERMANY	2	#	\$	§	Ä	Ö	Ü	^	'	ä	ö	ü	ß	¢	¥
ENGLAND	3	£	\$	@	[	\	\]	^	'	{	|	}	-	¢	¥
DENMARK I	4	#	\$	@	Æ	Ø	Å	^	'	æ	ø	å	-	ø	Ø
SWEDEN	5	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü	¢	¥
ITALY	6	#	\$	@	°	\	é	^	ù	à	ò	è	ì	¢	¥
SPAIN I	7	Pt	\$	@	í	Ñ	¿	^	'	¨	ñ	}	-	¢	¥
JAPAN	8	#	\$	@	[	¥	]	^	'	{	|	}	-	¢	¥
NORWAY	9	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	ø	Ø
DENMARK II	10	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	ø	Ø
SPAIN II	11	#	\$	á	í	Ñ	¿	é	'	í	ñ	ó	ú	¢	¥
LATIN AMERICA	12	#	\$	á	í	Ñ	¿	é	ü	í	ñ	ó	ú	¢	¥
KOREA	13	#	\$	@	[	₩	]	^	'	{	|	}	-	¢	¥
LEGAL	64	#	\$	§	°	'	"	¶	'	©	®	†	™	¢	¥

*1

*2

Note:

*1 These characters can be changed only in the Epson LQ-1050 mode. In the IBM Proprinter XL24E mode, International Character Set is set to USA and it can not be changed.

*2 These characters are effective in both Graphic Character Set 2 of the Epson LQ-1050 and IBM Proprinter XL24E modes.

Appendix B

Proportional Spacing Tables

ASCII Characters

Epson LQ-1050 Mode Characters

ASCII code	Char.	Width	
		Normal	Script
0	à	30	20
1	è	30	20
2	ù	36	24
3	ò	30	20
4	ì	18	12
5	°	24	16
6	£	30	20
7	ï	30	20
8	¿	30	20
9	Ñ	36	24
10	ñ	36	24
11	α	30	20
12	Pt	42	28
13	Ä	36	24
14	á	30	20
15	ç	30	20
16	§	30	20
17	ß	36	24
18	Æ	42	28
19	æ	42	28
20	Ø	36	24
21	ø	30	20
22	·	30	20
23	Å	36	24
24	Ö	36	24
25	Ü	42	28
26	ä	30	20
27	ö	30	20
28	ü	36	24
29	É	36	24
30	é	30	20
31	¥	36	24
32	SPACE	30	20
33	!	18	12
34	"	30	20
35	#	30	20
36	\$	30	20
37	%	36	24
38	&	36	24
39	'	18	12
40	(	24	16
41	)	24	16
42	*	30	20
43	+	30	20

ASCII code	Char.	Width	
		Normal	Script
44	,	18	12
45	-	30	20
46	.	18	12
47	/	30	20
48	0	30	20
49	1	30	20
50	2	30	20
51	3	30	20
52	4	30	20
53	5	30	20
54	6	30	20
55	7	30	20
56	8	30	20
57	9	30	20
58	:	18	12
59	;	18	12
60	<	30	20
61	=	30	20
62	>	30	20
63	?	30	20
64	@	36	24
65	A	36	24
66	B	36	24
67	C	36	24
68	D	36	24
69	E	36	24
70	F	36	24
71	G	36	24
72	H	36	24
73	I	24	16
74	J	30	20
75	K	36	24
76	L	36	24
77	M	42	28
78	N	36	24
79	O	36	24
80	P	36	24
81	Q	36	24
82	R	36	24
83	S	36	24
84	T	36	24
85	U	42	28
86	V	36	24
87	W	42	28

ASCII code	Char.	Width	
		Normal	Script
88	X	36	24
89	Y	36	24
90	Z	30	20
91	[	24	16
92	\	30	20
93	]	24	16
94	^	30	20
95	_	30	24
96	`	18	12
97	a	30	20
98	b	36	24
99	c	30	20
100	d	36	24
101	e	30	20
102	f	24	16
103	g	36	24
104	h	36	24
105	i	18	12
106	j	24	16
107	k	36	24
108	l	18	12
109	m	42	28
110	n	36	24
111	o	30	20
112	p	36	24
113	q	36	24
114	r	30	20
115	s	30	20
116	t	24	16
117	u	36	24
118	v	36	24
119	w	42	28
120	x	30	20
121	y	36	24
122	z	30	20
123	{	24	16
124	}	18	12
125	!	24	16
126	~	30	20
127	ø	30	20

Unit: 1/360 inch (0.07 mm)

IBM Proprinter XL24E Mode Characters

ASCII code	Char.	Width	
		Normal	Script
32	SPACE	30	
33	!	30	
34	"	30	
35	#	30	
36	\$	30	
37	%	30	
38	&	36	
39	'	18	
40	(	30	
41	)	30	
42	*	30	
43	+	30	
44	,	30	
45	-	30	
46	.	30	
47	/	30	
48	0	30	
49	1	30	
50	2	30	
51	3	30	
52	4	30	
53	5	30	
54	6	30	
55	7	30	
56	8	30	
57	9	30	
58	:	30	
59	;	30	
60	<	30	
61	=	30	
62	>	30	
63	?	30	
64	@	30	
65	A	42	
66	B	42	
67	C	42	
68	D	42	
69	E	36	
70	F	36	
71	G	42	
72	H	42	
73	I	24	
74	J	30	
75	K	42	

ASCII code	Char.	Width	
		Normal	Script
76	L	36	
77	M	42	
78	N	42	
79	O	42	
80	P	36	
81	Q	42	
82	R	42	
83	S	36	
84	T	42	
85	U	42	
86	V	42	
87	W	42	
88	X	42	
89	Y	42	
90	Z	36	
91	[	30	
92	\	30	
93	]	30	
94	^	30	
95	_	30	
96	`	30	
97	a	30	
98	b	36	
99	c	30	
100	d	36	
101	e	30	
102	f	24	
103	g	36	
104	h	36	
105	i	18	
106	j	18	
107	k	36	
108	l	18	
109	m	42	
110	n	36	
111	o	30	
112	p	36	
113	q	36	
114	r	30	
115	s	30	
116	t	24	
117	u	36	
118	v	36	
119	w	42	

ASCII code	Char.	Width	
		Normal	Script
120	x	36	
121	y	36	
122	z	30	
123	{	30	
124	|	30	
125	}	30	
126	~	30	

Unit: 1/360 inch (0.07 mm)

Appendix B

Special Characters

Epson LQ-1050 Mode Characters

ASCII code	Char.	Width	
		Normal	Script
21	§	30	20
36	¤	30	20
48	ø	30	20
91	°	24	16
92	Ø	36	24
92	·	36	24
92	✱	42	28
93	"	36	24
123	©	36	24
124	ø	30	20
125	+	36	24
126	~	30	20
126	™	36	24
128	Ç	36	24
129	ü	36	24
130	é	30	20
131	à	30	20
132	ä	30	20
133	â	30	20
134	á	30	20
135	ç	30	20
136	ê	30	20
137	ë	30	20
138	è	30	20
139	ï	18	12
140	î	18	12
141	í	18	12
142	À	36	24
143	Á	36	24
144	Ê	36	24
145	æ	42	28
146	Æ	42	28
147	ó	30	20
148	ô	30	20
149	õ	30	20
150	û	36	24
151	ü	36	24
152	ÿ	36	24
153	Ö	36	24
154	Ü	42	28
155	ƒ	30	20
156	£	30	20

ASCII code	Char.	Width	
		Normal	Script
157	¥	36	24
158	Pt	42	28
159	/	30	20
160	á	30	20
161	í	18	12
162	ó	30	20
163	ú	36	24
164	ñ	36	24
165	Ñ	36	24
166	ä	30	20
167	ö	30	20
168	¿	30	20
169	¡	30	20
170	¡	30	20
171	$\frac{1}{2}$	30	20
172	$\frac{1}{4}$	30	20
173	i	30	20
174	<<	30	20
175	>>	30	20
224	α	30	20
225	β	30	20
226	Γ	30	20
227	π	30	20
228	Σ	30	20
229	σ	30	20
230	μ	30	20
231	τ	30	20
232	Φ	30	20
233	θ	30	20
234	Ω	30	20
235	δ	30	20
236	∞	30	20
237	φ	30	20
238	⊂	30	20
239	⊃	30	20
240	≡	30	20
241	±	30	20
242	∞	30	20
243	∞	30	20
246	+	30	20
247	•	30	20
248	•	30	20

ASCII code	Char.	Width	
		Normal	Script
249	•	30	20
250	•	30	20
251	√	30	20
252	°	30	20
253	²	30	20
254	■	30	20
255	SP	30	20

Unit: 1/360 inch (0.07 mm)

IBM Proprinter XL24E Mode Characters

ASCII code	Char.	Width	
		Normal	Script
0	Ø	30	
1	◉	30	
2	●	30	
3	♥	30	
4	♦	30	
5	♠	30	
6	♣	30	
7	•	30	
8	◻	30	
9	◊	30	
10	■	30	
11	♂	30	
12	♀	30	
13	♫	30	
14	♪	30	
15	◊	30	
16	▶	30	
17	◀	30	
18	↑	30	
19	!!	30	
20	¶	30	
21	§	30	
22	—	30	
23	↕	30	
24	↑	30	
25	↓	30	
26	→	30	
27	←	30	
28	L	30	
29	↔	30	
30	▲	30	
31	▼	30	
127	△	30	
128	Ç	42	
129	ü	36	
130	é	30	
131	â	30	
132	ä	30	
133	à	30	
134	á	30	
135	ç	30	
136	ê	30	
137	ë	30	
138	è	30	
139	ï	18	

ASCII code	Char.	Width	
		Normal	Script
140	î	18	
141	í	18	
142	Ä	42	
143	Å	42	
144	É	36	
145	æ	42	
146	Æ	42	
147	ô	30	
148	ó	30	
149	ò	30	
150	û	36	
151	ü	36	
152	ÿ	36	
153	Ö	42	
154	Ü	42	
155	ƒ	30	
156	£	30	
157	¥	30	
158	Pts	42	
159	f	30	
160	á	30	
161	í	18	
162	ó	30	
163	û	36	
164	ñ	36	
165	Ñ	42	
166	ä	30	
167	ö	30	
168	ç	30	
169	ı	30	
170	ı	30	
171	ı	30	
172	ı	30	
173	ı	30	
174	<<	42	
175	>>	42	
224	α	30	
225	β	36	
226	Γ	36	
227	π	36	
228	Σ	42	
229	σ	36	
230	μ	36	

ASCII code	Char.	Width	
		Normal	Script
231	τ	30	
232	Φ	42	
233	θ	42	
234	Ω	42	
235	δ	30	
236	ε	30	
237	φ	42	
238	ε	30	
239	⊂	30	
240	≡	30	
241	±	30	
242	∓	30	
243	∨	30	
246	∞	30	
247	∞	30	
248	∞	30	
249	•	30	
250	•	30	
251	√	30	
252	π	30	
253	2	30	
254	■	30	
255	SP	30	

Unit: 1/360 inch (0.07 mm)

Appendix B

IBM Proprinter XL24E Mode Characters (Multilingual)

ASCII code	Char.	Width	
		Normal	Script
0	Ø	30	
1	◊	30	
2	●	30	
3	♥	30	
4	♦	30	
5	♣	30	
6	♠	30	
7	•	30	
8	◻	30	
9	○	30	
10	■	30	
11	♂	30	
12	♀	30	
13	♪	30	
14	♫	30	
15	◦	30	
16	▶	30	
17	◀	30	
18	↑	30	
19	!!	30	
20	¶	30	
21	§	30	
22	—	30	
23	‡	30	
24	↑	30	
25	↓	30	
26	→	30	
27	←	30	
28	↵	30	
29	↔	30	
30	▲	30	
31	▼	30	
127	△	30	
128	Ç	42	
129	ü	36	
130	é	30	
131	â	30	
132	ä	30	
133	à	30	
134	á	30	
135	ç	30	
136	ê	30	
137	ë	30	
138	è	30	
139	ï	18	

ASCII code	Char.	Width	
		Normal	Script
140	ī	18	
141	ı	18	
142	Ä	42	
143	Å	42	
144	É	36	
145	æ	42	
146	Æ	42	
147	ô	30	
148	ö	30	
149	ò	30	
150	û	36	
151	ù	36	
152	ÿ	36	
153	Ö	42	
154	Ü	42	
155	ø	30	
156	£	30	
157	Ø	42	
158	×	30	
159	f	30	
160	á	30	
161	ı	18	
162	ó	30	
163	ú	36	
164	ñ	36	
165	Ñ	42	
166	ä	30	
167	ö	30	
168	ç	30	
169	®	30	
170	┌	30	
171	½	30	
172	¼	30	
173	ı	30	
174	<<	42	
175	>>	42	
181	Á	42	
182	À	42	
183	Ä	42	
184	°	30	
207	¤	30	
208	Š	36	
209	Đ	42	
210	Ê	36	
211	Ë	36	

ASCII code	Char.	Width	
		Normal	Script
212	È	36	
213	ı	18	
214	ı	24	
215	ı	24	
216	ı	24	
221	ı	30	
222	ı	24	
224	Ó	42	
225	ß	36	
226	Ô	42	
227	Õ	42	
228	ó	30	
229	Ö	42	
230	μ	30	
231	þ	36	
232	þ	42	
233	Û	42	
234	Ü	42	
235	Ü	42	
236	ý	36	
237	Ý	42	
238	˙	30	
239	˙	30	
240	˙	30	
241	±	30	
242	—	30	
243	¼	30	
244	¶	30	
245	§	30	
246	+	30	
247	˙	30	
248	˙	30	
249	˙	30	
250	˙	30	
251	1	30	
252	3	30	
253	2	30	
254	■	30	
255	SP	30	

Unit: 1/360 inch (0.07 mm)

Appendix C

Structure of an Index Table Entry

10 cpi draft font

Address	Data
8010	40
8011	D3454A090000000000
801A	D3634A090000000000
8023	D3814A090000000000
802C	D39F4A090000000000
8035	D3BD4A090000000000
803E	D3DB4A090000000000
8047	D3F94A090000000000
8050	D41748090000000000
8059	D42F48090000000000
8062	D44748090000000000
806B	D45F4A090000000000
8074	D47D48090000000000
807D	D4954A090000000000
8086	D4B34A090000000000
808F	D4D14A090000000000
8098	D4EF4A090000000000
80A1	D50D4A090000000000
80AA	D52B4A090000000000
80B3	D5494A090000000000
80BC	D56749090000000000
80C5	D58249090000000000
80CE	D59D48090000000000
80D7	D5B546090000000000
80E0	D5C74A090000000000
80E9	D5E54A090000000000
80F2	D6034A090000000000
80FB	D62149090000000000
8104	D63C49090000000000
810D	D65746090000000000
8116	D66948090000000000
811F	D6814A090000000000
8128	D69F4A090000000000
8131	D6BD42090000000000
813A	D6C346090000000000
8143	D6D546090000000000
814C	D6E749090000000000

8155	D7024A090000000000
815E	D7204A090000000000
8167	D73E4A090000000000
8170	D75C44090000000000
8179	D76847090000000000
8182	D77D47090000000000
818B	D7924A090000000000
8194	D7B048090000000000
819D	D7C846090000000000
81A6	D7DA46090000000000
81AF	D7EC46090000000000
81B8	D7FE4A090000000000
81C1	D81C48090000000000
81CA	D83446090000000000
81D3	D8464A090000000000
81DC	D86448090000000000
81E5	D87C49090000000000
81EE	D89749090000000000
81F7	D8B249090000000000
8200	D8CD49090000000000
8209	D8E848090000000000
8212	D90049090000000000
821B	D91B46090000000000
8224	D92D46090000000000
822D	D93F4A090000000000
8236	D95D46090000000000
823F	D96F4A090000000000
8248	D98D4A090000000000
8251	D9AB4A090000000000
825A	D9C94A090000000000
8263	D9E747090000000000
826C	D9FC48090000000000
8275	DA1447090000000000
827E	DA2947090000000000
8287	DA3E47090000000000
8290	DA534A090000000000
8299	DA7145090000000000

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82A2	DA8048090000000000	8413	DE7049090000000000
82AB	DA9847090000000000	841C	DE8B48090000000000
82B4	DAAD49090000000000	8425	DEA348090000000000
82BD	DAC8460900000000000	842E	DEBB49090000000000
82C6	DADA4A090000000000	8437	DED64A090000000000
82CF	DAF84A090000000000	8440	DEF44A090000000000
82D8	DB1648090000000000	8449	DF124A090000000000
82E1	DB2E47090000000000	8452	DF304A090000000000
82EA	DB434A090000000000	845B	DF4E4A090000000000
82F3	DB6148090000000000	8464	DF6C48090000000000
82FC	DB7948090000000000	846D	DF8444090000000000
8305	DB9146090000000000	8476	DF9048090000000000
830E	DBA348090000000000	847F	DFA84A090000000000
8317	DBBB4A090000000000	8488	DFC64A090000000000
8320	DBD94A090000000000	8491	DFE44A090000000000
8329	DBF74A090000000000	849A	E00249090000000000
8332	DC154A090000000000	84A3	E01D4A090000000000
833B	DC334A090000000000	84AC	E03B4A090000000000
8344	DC5146090000000000	84B5	E05949090000000000
834D	DC634A090000000000	84BE	E0744A090000000000
8356	DC8146090000000000	84C7	E0924A090000000000
835F	DC934A090000000000	84D0	E0B04A090000000000
8368	D6BDC3890000000000	84D9	E0CE4A090000000000
8371	DCB147090000000000	84E2	E0EC48090000000000
837A	DC6480900000000000	84EB	E1044A090000000000
8383	DCDE49090000000000	84F4	E122490900000000000
838C	DCF948090000000000	84FD	E13D4A090000000000
8395	DD1149090000000000	8506	E15B47090000000000
839E	DD2C48090000000000	850F	E1704A090000000000
83A7	DD4448090000000000	8518	E18E4A090000000000
83B0	DD5C48090000000000	8521	E1AC48090000000000
83B9	DD7449090000000000	852A	E1C44A090000000000
83C2	DD8F48090000000000	8533	E1E248090000000000
83CB	DDA749090000000000	853C	E1FA4A090000000000
83D4	DDC24A090000000000	8545	E21848090000000000
83DD	DDE046090000000000	854E	E2304A090000000000
83E6	DDF249090000000000	8557	E24E4A090000000000
83EF	DE0D49090000000000	8560	E26C4A090000000000
83F8	DE2848090000000000	8569	E28A4A090000000000
8401	DE4048090000000000	8572	E2A848090000000000
840A	DE5848090000000000	857B	E2C048090000000000

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8584	E2D84A090000000000	86F5	E683C3490000000000
858D	E2F64A090000000000	86FE	E68CC5490000000000
8596	E3144A090000000000	8707	E69BC4490000000000
859F	E33249090000000000	8710	E6A7C6490000000000
85A8	E34D4A090000000000	8719	E6B9C6490000000000
85B1	E36B4A090000000000	8722	E6CBC6490000000000
85BA	E38948090000000000	872B	E6DDC7490000000000
85C3	E3A14A090000000000	8734	E6F2C7490000000000
85CC	E3BF4A090000000000	873D	E707C6490000000000
85D5	E3DD4A090000000000	8746	E719C3490000000000
85DE	E3FB4A090000000000	874F	E722C7490000000000
85E7	E41949090000000000	8758	E737C5490000000000
85F0	E43448090000000000	8761	E746C7490000000000
85F9	E44C4A090000000000	876A	E75BC5490000000000
8602	E46A46090000000000	8773	E76AC7490000000000
860B	E47C46090000000000	877C	E77FC6490000000000
8614	E48E4A090000000000	8785	E791C4490000000000
861D	E4AC4A090000000000	878E	E79DC4490000000000
8626	E4CA46090000000000	8797	E7A9C6490000000000
862F	E4DC4A090000000000	87A0	E7BBC7490000000000
8638	E4FA4A090000000000	87A9	E7D0C5490000000000
8641	E518C9090000000000	87B2	E7DFC5490000000000
864A	E533C8090000000000	87BB	E7EEC4490000000000
8653	E54BC9090000000000	87C4	E7FAC3490000000000
865C	E566C4490000000000	87CD	E803C3490000000000
8665	E572C5490000000000	87D6	E80CC5490000000000
866E	E581C5490000000000	87DF	E81BC4490000000000
8677	E590C7490000000000	87E8	E827C3490000000000
8680	E5A5C7490000000000	87F1	E830A0900000000000
8689	E5BAC5490000000000	87FA	E84E4A090000000000
8692	E5C9C7490000000000	8803	E86C46090000000000
869B	E5DEC6490000000000	880C	E87E48090000000000
86A4	E5F0C7490000000000	8815	E89649090000000000
86AD	E605C7490000000000	881E	E8B148090000000000
86B6	E61AC7490000000000	8827	E8C9A0900000000000
86BF	E62FC5490000000000	8830	E8E748090000000000
86C8	E63EC5490000000000	8839	E8FF4A090000000000
86D1	E64DC4490000000000	8842	E91D48090000000000
86DA	E659C5490000000000	884B	E93548090000000000
86E3	E668C5490000000000	8854	E94D48090000000000
86EC	E677C4490000000000	885D	E9654A090000000000

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8866	E9834A090000000000
886F	E9A149090000000000
8878	E9BC49090000000000
8881	E9D744090000000000
888A	E9E348090000000000
8893	E9FB4A090000000000
889C	EA194A090000000000
88A5	EA37C7490000000000
88AE	EA4C47090000000000
88B7	EA614A090000000000
88C0	EA7F4A090000000000
88C9	EA9D48090000000000
88D2	EAB548090000000000
88DB	EACD46090000000000
88E4	EADF4A090000000000
88ED	EAFD49090000000000
88F6	EB1849090000000000
88FF	EB3346090000000000
8908	EB4542090000000000

10 cpi LQ font

Address	Data
8911	41
8912	A4145C230000000000
891B	A46859230000000000
8924	A4B35B230000000000
892D	A50459230000000000
8936	A54F5B230000000000
893F	A5A059230000000000
8948	A5EB5B230000000000
8951	A63C48230000000000
895A	A6544D230000000000
8963	A67B50230000000000
896C	A6AB4F230000000000
8975	A6D855230000000000
897E	A71750230000000000
8987	A74757230000000000
8990	A78C54230000000000
8999	A7C856230000000000
89A2	A80A4A230000000000
89AB	A8284A230000000000
89B4	A84656230000000000
89BD	A8884A230000000000
89C6	A8A64D230000000000
89CF	A8CD59230000000000
89D8	A91844230000000000
89E1	A92456230000000000
89EA	A96656230000000000
89F3	A9A856230000000000
89FC	A9EA4E230000000000
8A05	AA144E230000000000
8A0E	AA3E45230000000000
8A17	AA4D58230000000000
8A20	AA955A230000000000
8A29	AAE35A230000000000
8A32	AB3142230000000000
8A3B	AB3748230000000000
8A44	AB4F4E230000000000
8A4D	AB794E230000000000
8A56	ABA355230000000000
8A5F	ABE259230000000000

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8A68	AC2D5A230000000000	8BD0	B3AD5B230000000000
8A71	AC7B48230000000000	8BD9	B3FE54230000000000
8A7A	AC934C230000000000	8BE2	B43A4C230000000000
8A83	ACB74C230000000000	8BEB	B45E5B230000000000
8A8C	ACDB58230000000000	8BF4	B4AF53230000000000
8A95	AD2346230000000000	8BFD	B4E857230000000000
8A9E	AD354D230000000000	8C06	B52D4A230000000000
8AA7	AD5C44230000000000	8C0F	B54B50230000000000
8AB0	AD6846230000000000	8C18	B57B5C230000000000
8AB9	AD7A5C230000000000	8C21	B5CF5E230000000000
8AC2	ADCE54230000000000	8C2A	B62956230000000000
8ACB	AE0A4A230000000000	8C33	B66B58230000000000
8AD4	AE2856230000000000	8C3C	B6B358230000000000
8ADD	AE6A55230000000000	8C45	B6FB45230000000000
8AE6	AEA954230000000000	8C4E	B70A5C230000000000
8AEF	AEE551230000000000	8C57	B75E45230000000000
8AF8	AF1857230000000000	8C60	B76D4C230000000000
8B01	AF5D53230000000000	8C69	AB31C2A30000000000
8B0A	AF9654230000000000	8C72	B79149230000000000
8B13	AFD257230000000000	8C7B	B7AC53230000000000
8B1C	B017462300000000000	8C84	B7E553230000000000
8B25	B0294E230000000000	8C8D	B81E56230000000000
8B2E	B05350230000000000	8C96	B86053230000000000
8B37	B083442300000000000	8C9F	B89954230000000000
8B40	B08F50230000000000	8CA8	B8D54B230000000000
8B49	B0BF53230000000000	8CB1	B8F656230000000000
8B52	B0F855230000000000	8CBA	B93858230000000000
8B5B	B1375F230000000000	8CC3	B9804A230000000000
8B64	B1944F230000000000	8CCC	B99E4B230000000000
8B6D	B1C156230000000000	8CD5	B9BF58230000000000
8B76	B2034F230000000000	8CDE	BA074A230000000000
8B7F	B230492300000000000	8CE7	BA2554230000000000
8B88	B24B49230000000000	8CF0	BA6155230000000000
8B91	B26656230000000000	8CF9	BAA056230000000000
8B9A	B2A84A230000000000	8D02	BAE253230000000000
8BA3	B2C646230000000000	8D0B	B1B532300000000000
8BAC	B2D84E230000000000	8D14	BB544D230000000000
8BB5	B302572300000000000	8D1D	BB7B56230000000000
8BBE	B34748230000000000	8D26	BBBD4F230000000000
8BC7	B35F5A230000000000	8D2F	BBEA54230000000000

Appendix C

8D38	BC265A230000000000	8EA9	C6C454230000000000
8D41	BC7460230000000000	8EB2	C70057230000000000
8D4A	BCD458230000000000	8EBB	C7454E230000000000
8D53	BD1C5D230000000000	8EC4	C76F5B230000000000
8D5C	BD735A230000000000	8ECD	C7C057230000000000
8D65	BDC14E230000000000	8ED6	C80556230000000000
8D6E	BDEB44230000000000	8EDF	C8475C230000000000
8D77	BDF74E230000000000	8EE8	C89B55230000000000
8D80	BE214E230000000000	8EF1	C8DA54230000000000
8D89	BE4B5C230000000000	8EFA	C91654230000000000
8D92	BE9F5A230000000000	8F03	C95245230000000000
8D9B	BEED56230000000000	8F0C	C96145230000000000
8DA4	BF2F58230000000000	8F15	C97051230000000000
8DAD	BF7756230000000000	8F1E	C9A350230000000000
8DB6	BFB955230000000000	8F27	C9D348230000000000
8DBF	BFF856230000000000	8F30	C9EB58230000000000
8DC8	C03A57230000000000	8F39	CA3358230000000000
8DD1	C07F55230000000000	8F42	CA7BC9230000000000
8DDA	C0BE56230000000000	8F4B	CA96C9230000000000
8DE3	C10055230000000000	8F54	CAB1C9230000000000
8DEC	C13F59230000000000	8F5D	CACCC4630000000000
8DF5	C18A50230000000000	8F66	CAD8C4630000000000
8DFE	C1BA52230000000000	8F6F	CAE4C4630000000000
8E07	C1F04C230000000000	8F78	CAF0C6630000000000
8E10	C2145E230000000000	8F81	CB02C6630000000000
8E19	C26E5E230000000000	8F8A	CB14C4630000000000
8E22	C2C84E230000000000	8F93	CB20C6630000000000
8E2B	C2F258230000000000	8F9C	CB32C6630000000000
8E34	C33A55230000000000	8FA5	CB44C6630000000000
8E3D	C37958230000000000	8FAE	CB56C6630000000000
8E46	C3C156230000000000	8FB7	CB68C6630000000000
8E4F	C4035A230000000000	8FC0	CB7AC4630000000000
8E58	C45156230000000000	8FC9	CB86C4630000000000
8E61	C49358230000000000	8FD2	CB92C4630000000000
8E6A	C4DB5C230000000000	8FDB	CB9EC4630000000000
8E73	C52F58230000000000	8FE4	CBAAC4630000000000
8E7C	C57752230000000000	8FED	CBB6C4630000000000
8E85	C5AD51230000000000	8FF6	CBC2C2630000000000
8E8E	C5E057230000000000	8FFF	CBC8C4630000000000
8E97	C6255A230000000000	9008	CBD4C4630000000000
8EA0	C6735B230000000000	9011	CBE0C6630000000000

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901A	CBF2C6630000000000	918B	D10E46230000000000
9023	CC04C6630000000000	9194	D12050230000000000
902C	CC16C6630000000000	919D	D15050230000000000
9035	CC28C6630000000000	91A6	D180CF630000000000
903E	CC3AC6630000000000	91AF	D1AD4E230000000000
9047	CC4CC2630000000000	91B8	D1D748230000000000
9050	CC52C6630000000000	91C1	D1EF50230000000000
9059	CC64C4630000000000	91CA	D21F52230000000000
9062	CC70C6630000000000	91D3	D25548230000000000
906B	CC82C4630000000000	91DC	D26D46230000000000
9074	CC8EC6630000000000	91E5	D27F5E230000000000
907D	CCA0C6630000000000	91EE	D2D951230000000000
9086	CCB2C4630000000000	91F7	D30C4D230000000000
908F	CCBEC4630000000000	9200	D33344230000000000
9098	CCCAC6630000000000	9209	D33F42230000000000
90A1	CCDCC6630000000000		
90AA	CCEEC4630000000000		
90B3	CCFAC4630000000000		
90BC	CD06C4630000000000		
90C5	CD12C2630000000000		
90CE	CD18C2630000000000		
90D7	CD1EC3630000000000		
90E0	CD27C3630000000000		
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90FB	CD905A230000000000		
9104	CDDE48230000000000		
910D	CDF650230000000000		
9116	CE2655230000000000		
911F	CE6554230000000000		
9128	CEA152230000000000		
9131	CED74F230000000000		
913A	CF0452230000000000		
9143	CF3A58230000000000		
914C	CF825A230000000000		
9155	CFD056230000000000		
915E	D01255230000000000		
9167	D05158230000000000		
9170	D09951230000000000		
9179	D0CC52230000000000		
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Appendix C

Proportional Spacing LQ font

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9213	EB4B5B1D0000000000
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922E	A504581D0000000000
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9240	A5A0591D0000000000
9249	A5EB5B1D0000000000
9252	A63C481D0000000000
925B	A6544C1D0000000000
9264	A67B501D0000000000
926D	A6AB4E1D0000000000
9276	A6D8551D0000000000
927F	A717501D0000000000
9288	A747561D0000000000
9291	A78C531D0000000000
929A	A7C8551D0000000000
92A3	A80A4A1D0000000000
92AC	A8284A1D0000000000
92B5	A846561D0000000000
92BE	EB9C4A1D0000000000
92C7	EBBA4E1D0000000000
92D0	EBE4581D0000000000
92D9	A918441D0000000000
92E2	A924561D0000000000
92EE	A966561D0000000000
92F4	A9A8561D0000000000
92FD	A9EA4D1D0000000000
9306	AA144E1D0000000000
930F	AA3E451D0000000000
9318	AA4D581D0000000000
9321	AA955A1D0000000000
932A	AAE35A1D0000000000
9333	EC2C421D0000000000
933C	EC32481D0000000000
9345	EC4A4E1D0000000000
934E	EC744E1D0000000000
9357	EC9E551D0000000000
9360	ECDD521D0000000000

9369	ED135A230000000000
9372	ED6148110000000000
937B	ED794C1D0000000000
9384	ED9D4C1D0000000000
938D	EDC1581D0000000000
9396	AD23461D0000000000
939F	EE094D1D0000000000
93A8	EE30441D0000000000
93B1	EE3C461D0000000000
93BA	EE4E5B1D0000000000
93C3	EE9F541D0000000000
93CC	EEDB4A1D0000000000
93D5	EEF9561D0000000000
93DE	EF3B531D0000000000
93E7	EF74531D0000000000
93F0	EFAD541D0000000000
93F9	EFE9571D0000000000
9402	F02E521D0000000000
940B	F064541D0000000000
9414	F0A0571D0000000000
941D	F0E5461D0000000000
9426	F0F74D1D0000000000
942F	B053501D0000000000
9438	B083441D0000000000
9441	B08F501D0000000000
944A	F11E531D0000000000
9453	F157551D0000000000
945C	F19660290000000000
9465	F1F652290000000000
946E	F22C58290000000000
9477	F27452290000000000
9480	F2AA49230000000000
9489	F2C54B230000000000
9492	F2E659290000000000
949B	F3314E290000000000
94A4	F35B46170000000000
94AD	F36D4E1D0000000000
94B6	F3975C290000000000
94BF	F3EB48230000000000

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94C8	F4035E290000000000	9639	FD1E5A230000000000
94D1	F45D5D290000000000	9642	FD6C61290000000000
94DA	F4B45A290000000000	964B	FDCF58230000000000
94E3	F5024E230000000000	9654	FE175D230000000000
94EC	F52C5E290000000000	965D	FE6E581D0000000000
94F5	F58655290000000000	9666	FEB64E1D0000000000
94FE	F5C554230000000000	966F	FEE0441D0000000000
9507	F6014E290000000000	9678	FEEC4E1D0000000000
9510	F62B5C290000000000	9681	FF164E1D0000000000
9519	F67F61290000000000	968A	BE4B5C1D0000000000
9522	F6E261290000000000	9693	FF405B290000000000
952B	F74564290000000000	969C	4FFF56230000000000
9534	F7B159290000000000	96A5	5041591D0000000000
953D	F7FC59230000000000	96AE	508C571D0000000000
9546	F847451D0000000000	96B7	50D1541D0000000000
954F	F8565B1D0000000000	96C0	510D571D0000000000
9558	F8A7451D0000000000	96C9	5152551D0000000000
9561	F8B64E1D0000000000	96D2	5191561D0000000000
956A	AB31C29D0000000000	96DB	51D3571D0000000000
9573	F8E0491D0000000000	96E4	5218551D0000000000
957C	F8FB531D0000000000	96ED	5257581D0000000000
9585	F93452230000000000	96F6	529F4B110000000000
958E	F96A531D0000000000	96FF	52C04E110000000000
9597	F9A353230000000000	9708	52EA4A110000000000
95A0	F9DC541D0000000000	9711	530862290000000000
95A9	FA184C170000000000	971A	536E60290000000000
95B2	FA3C53230000000000	9723	53CE4F230000000000
95BB	FA7556230000000000	972C	53FB5D290000000000
95C4	FAB745110000000000	9735	545259290000000000
95CD	FAC64B110000000000	973E	549D581D0000000000
95D6	FAE753230000000000	9747	54E5541D0000000000
95DF	FB2046110000000000	9750	5521581D0000000000
95E8	FB3258290000000000	9759	556957230000000000
95F1	FB7A53230000000000	9762	55AE56230000000000
95FA	FBB3541D0000000000	976B	5F05D2300000000000
9603	FBEF53230000000000	9774	56475B290000000000
960C	FC2853230000000000	977D	569859290000000000
9615	FC61501D0000000000	9786	56E3551D0000000000
961E	FC91521D0000000000	978F	5722551D0000000000
9627	FCC749170000000000	9798	5761581D0000000000
9630	FCE254230000000000	97A1	57A95F290000000000

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97AA	5806531D0000000000	991B	CBF2C65D0000000000
97B3	583F571D0000000000	9924	CC04C65D0000000000
97BC	588449110000000000	992D	CC16C65D0000000000
97C5	589F591D0000000000	9936	CC28C65D0000000000
97CE	58EA57230000000000	993F	CC3AC65D0000000000
97D7	592F56230000000000	9948	CC4CC25D0000000000
97E0	597160290000000000	9951	CC52C65D0000000000
97E9	59D1551D0000000000	995A	CC64C45D0000000000
97F2	5A10541D0000000000	9963	CC70C65D0000000000
97FB	5A4C531D0000000000	996C	CC82C45D0000000000
9804	C952451D0000000000	9975	CC8EC65D0000000000
980D	C961451D0000000000	997E	CCA0C65D0000000000
9816	5A85511D0000000000	9987	CCB2C45D0000000000
981F	5AB8501D0000000000	9990	CCBEC45D0000000000
9828	5AE8481D0000000000	9999	CCCAC65D0000000000
9831	5B005A290000000000	99A2	CCDCC65D0000000000
983A	5B4E5A290000000000	99AB	CCEEC45D0000000000
9843	7C09C51D0000000000	99B4	CCFAC45D0000000000
984C	7C18C51D0000000000	99BD	CD06C45D0000000000
9855	7C27C31D0000000000	99C6	CD12C25D0000000000
985E	CACCC45D0000000000	99CF	CD18C25D0000000000
9867	CAD8C45D0000000000	99D8	CD1EC35D0000000000
9870	CAE4C45D0000000000	99E1	CD27C35D0000000000
9879	CAF0C65D0000000000	99EA	CD30C25D0000000000
9882	CB02C65D0000000000	99F3	5B9C5E1D0000000000
988B	CB14C45D0000000000	99FC	5BF65A230000000000
9894	CB20C65D0000000000	9A05	5C4448230000000000
989D	CB32C65D0000000000	9A0E	5C5C50230000000000
98A6	CB44C65D0000000000	9A17	5C8C5A290000000000
98AF	CB56C65D0000000000	9A20	5CDA54230000000000
98B8	CB68C65D0000000000	9A29	5D1652230000000000
98C1	CB7AC45D0000000000	9A32	5D4C4D1D0000000000
98CA	CB86C45D0000000000	9A3B	5D7356290000000000
98D3	CB92C45D0000000000	9A44	5DB55A290000000000
98DC	CB9EC45D0000000000	9A4D	5E035A290000000000
98E5	CBAAC45D0000000000	9A56	5E51561D0000000000
98EE	CBB6C45D0000000000	9A5F	D012541D0000000000
98F7	CBC2C25D0000000000	9A68	5E9358290000000000
9900	CBC8C45D0000000000	9A71	5EDB511D0000000000
9909	CBD4C45D0000000000	9A7A	D0CC521D0000000000
9912	CBE0C65D0000000000	9A83	D102441D0000000000

9A8C	D10E461D0000000000
9A95	D120501D0000000000
9A9E	D150501D0000000000
9AA7	D180CF5D0000000000
9AB0	D1AD4E1D0000000000
9AB9	D1D7481D0000000000
9AC2	D1EF501D0000000000
9ACB	D21F521D0000000000
9AD4	D255481D0000000000
9ADD	D26D461D0000000000
9AE6	D27F5E1D0000000000
9AEF	5F0E511D0000000000
9AF8	5F414D1D0000000000
9B01	D333441D0000000000
9B0A	5F68421D0000000000

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Address	Data
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9B14	5F6E581D0000000000
9B1D	A468581D0000000000
9B26	A4B35A1D0000000000
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9B38	A54F5B1D0000000000
9B41	A5A0591D0000000000
9B4A	A5EB5B1D0000000000
9B53	A63C481D0000000000
9B5C	A6544C1D0000000000
9B65	A67B501D0000000000
9B6E	A6AB4E1D0000000000
9B77	A6D8551D0000000000
9B80	A717501D0000000000
9B89	A747561D0000000000
9B92	A78C531D0000000000
9B9B	A7C8551D0000000000
9BA4	A80A4A1D0000000000
9BAD	A8284A1D0000000000
9BB6	A846561D0000000000
9BBF	5FB64E1D0000000000
9BC8	5FE04D1D0000000000
9BD1	6007531D0000000000
9BDA	A918441D0000000000
9BE3	A924561D0000000000
9BEC	A966561D0000000000
9BF5	A9A8561D0000000000
9BFE	A9EA4D1D0000000000
9C07	AA144E1D0000000000
9C10	AA3E451D0000000000
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9C2B	AAE35A1D0000000000
9C34	AB31421D0000000000
9C3D	6040481D0000000000
9C46	60584E1D0000000000
9C4F	6082551D0000000000
9C58	60C1541D0000000000
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9C6A	6151591D0000000000	9DD2	67AB561D0000000000
9C73	619C481D0000000000	9DDB	67ED501D0000000000
9C7C	61B44E1D0000000000	9DE4	681D4D1D0000000000
9C85	61DE4E1D0000000000	9DED	6844551D0000000000
9C8E	6208571D0000000000	9DF6	6883501D0000000000
9C97	AD23461D0000000000	9DFF	68B3511D0000000000
9CA0	624D481D0000000000	9E08	68E64C1D0000000000
9CA9	6265441D0000000000	9E11	690A501D0000000000
9CB2	6271461D0000000000	9E1A	693A591D0000000000
9CBB	6283501D0000000000	9E23	69855C1D0000000000
9CC4	62B3501D0000000000	9E2C	69D95A1D0000000000
9CCD	62E3461D0000000000	9E35	6A27571D0000000000
9CD6	62F5571D0000000000	9E3E	6A6C581D0000000000
9CDF	633A4F1D0000000000	9E47	6AB4451D0000000000
9CE8	6367531D0000000000	9E50	6AC3501D0000000000
9CF1	63A04F1D0000000000	9E59	6AF3451D0000000000
9CFA	63CD551D0000000000	9E62	6B024A1D0000000000
9D03	640C531D0000000000	9E6B	AB31C29D0000000000
9D0C	6445551D0000000000	9E74	6B204A1D0000000000
9D15	6484551D0000000000	9E7D	6B3E531D0000000000
9D1E	64C3461D0000000000	9E86	6B77531D0000000000
9D27	64D5481D0000000000	9E8F	6BB0521D0000000000
9D30	B053501D0000000000	9E98	6BE6501D0000000000
9D39	B083441D0000000000	9EA1	6C16511D0000000000
9D42	B08F501D0000000000	9EAA	6C494A1D0000000000
9D4B	64ED511D0000000000	9EB3	6C67561D0000000000
9D54	6520571D0000000000	9EBC	6CA9521D0000000000
9D5D	65655C1D0000000000	9EC5	6CDF4B1D0000000000
9D66	65B94D1D0000000000	9ECE	6D004D1D0000000000
9D6F	65E0501D0000000000	9ED7	6D27561D0000000000
9D78	66104E1D0000000000	9EE0	6D69481D0000000000
9D81	663A4B1D0000000000	9EE9	6D81521D0000000000
9D8A	665B4A1D0000000000	9EF2	6DB7521D0000000000
9D93	6679511D0000000000	9EFB	6DED521D0000000000
9D9C	66AC4A1D0000000000	9F04	6E234F1D0000000000
9DA5	66CA481D0000000000	9F0D	6E50501D0000000000
9DAE	66E24E1D0000000000	9F16	6E80531D0000000000
9DB7	670C531D0000000000	9F1F	6EB9501D0000000000
9DC0	67454A1D0000000000	9F28	6EE94A1D0000000000
9DC9	6763581D0000000000	9F31	6F07501D0000000000

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9F55	70215A1D0000000000	A0C6	7957571D0000000000
9F5E	706F591D0000000000	A0CF	799C551D0000000000
9F67	70BA4A1D0000000000	A0D8	79DB561D0000000000
9F70	70D8441D0000000000	A0E1	7A1D581D0000000000
9F79	70E44A1D0000000000	A0EA	7A65541D0000000000
9F82	71024D1D0000000000	A0F3	7AA1501D0000000000
9F8B	BE4B5C1D0000000000	A0FC	7AD1501D0000000000
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9FAF	71E6561D0000000000	A120	7B37511D0000000000
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9FC1	726D571D0000000000	A132	7B82561D0000000000
9FCA	72B2561D0000000000	A13B	7BC4571D0000000000
9FD3	72F4561D0000000000	A144	7C09C51D0000000000
9FDC	7336531D0000000000	A14D	7C18C51D0000000000
9FE5	736F531D0000000000	A156	7C27C31D0000000000
9FEE	73A8531D0000000000	A15F	CACCC45D0000000000
9FF7	73E14E1D0000000000	A168	CAD8C45D0000000000
A000	740B4D1D0000000000	A171	CAE4C45D0000000000
A009	74324D1D0000000000	A17A	CAF0C65D0000000000
A012	74595B1D0000000000	A183	CB02C65D0000000000
A01B	74AA571D0000000000	A18C	CB14C45D0000000000
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A03F	75AF541D0000000000	A1B0	CB56C65D0000000000
A048	75EB521D0000000000	A1B9	CB68C65D0000000000
A051	7621571D0000000000	A1C2	CB7AC45D0000000000
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A090	77CE581D0000000000	A201	CBC8C45D0000000000
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Appendix C

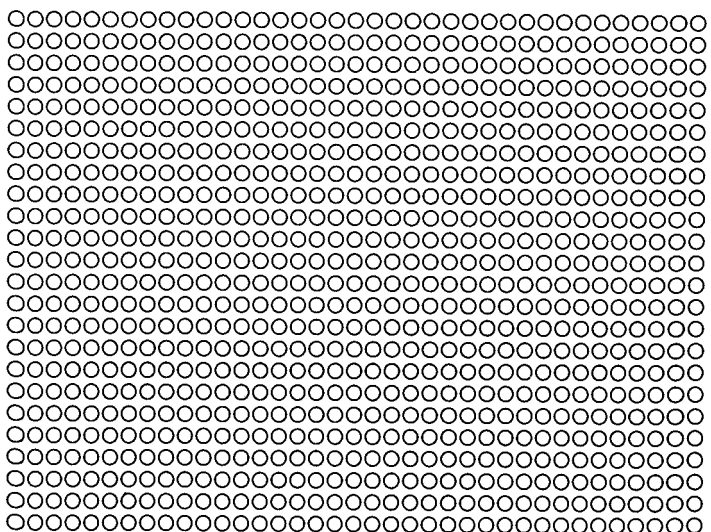
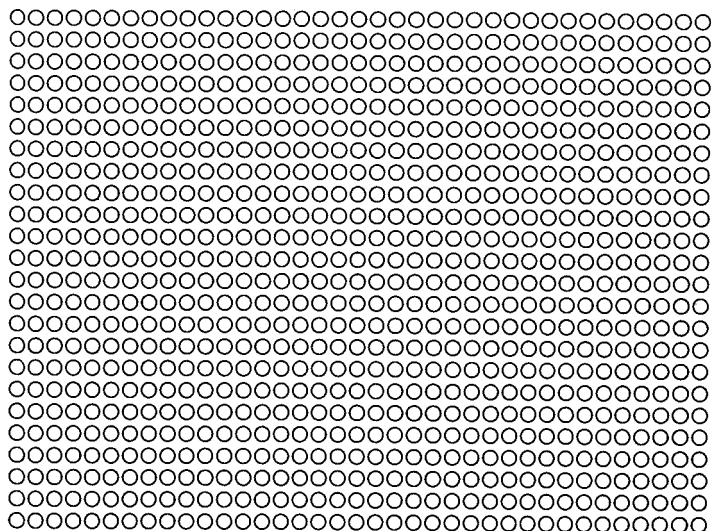
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A225	CC04C65D0000000000	A396	D120501D0000000000
A22E	CC16C65D0000000000	A39F	D150501D0000000000
A237	CC28C65D0000000000	A3A8	D180CF5D0000000000
A240	CC3AC65D0000000000	A3B1	D1AD4E1D0000000000
A249	CC4CC25D0000000000	A3BA	D1D7481D0000000000
A252	CC52C65D0000000000	A3C3	D1EF501D0000000000
A25B	CC64C45D0000000000	A3CC	D21F521D0000000000
A264	CC70C65D0000000000	A3D5	D255481D0000000000
A26D	CC82C45D0000000000	A3DE	D26D461D0000000000
A276	CC8EC65D0000000000	A3E7	D27F5E1D0000000000
A27F	CCA0C65D0000000000	A3F0	7F3C501D0000000000
A288	CCB2C45D0000000000	A3F9	7F6C4E1D0000000000
A291	CCBEC45D0000000000	A402	D333441D0000000000
A29A	CCCAC65D0000000000	A40B	7F96421D0000000000
A2A3	CCDCC65D0000000000		
A2AC	CCEEC45D0000000000		
A2B5	CCFAC45D0000000000		
A2BE	CD06C45D0000000000		
A2C7	CD12C25D0000000000		
A2D0	CD18C25D0000000000		
A2D9	CD1EC35D0000000000		
A2E2	CD27C35D0000000000		
A2EB	CD30C25D0000000000		
A2F4	7C30581D0000000000		
A2FD	7C78551D0000000000		
A306	7CB7481D0000000000		
A30F	7CCF501D0000000000		
A318	7CFF521D0000000000		
A321	7D35531D0000000000		
A32A	7D6E571D0000000000		
A333	7DB3511D0000000000		
A33C	7DE6501D0000000000		
A345	7E16541D0000000000		
A34E	7E52541D0000000000		
A357	7E8E541D0000000000		
A360	D012541D0000000000		
A369	7ECA561D0000000000		
A372	7F0C501D0000000000		
A37B	D0CC521D0000000000		
A384	D102441D0000000000		

C

Appendix D

Download Character Matrix Blanks: LQ

24×37



D

Make copies of this page first.

Then use blank matrices to design your download characters.

Paper Specifications

Paper which may be used with this unit must be within the specifications provided below.

1. Fanfold paper

Width: 4~15.5 inches (102~394 mm)

Quality and number of sheets:

* only for the last sheet

Type of paper	Sheets	Weight			
		in lbs		in g/m ²	
		push	pull	push	pull
Fine-quality paper	1	16~24	18~24	60~90	68~90
Non-carbon	2~4	11~14 (17*)		41~53 (64*)	
Multi-layered with carbon	2	11~14 (17*)		41~53 (64*)	

Note:

- When using multi-part Fanfold paper, especially in environments which have very high or low temperature and/or humidity, we recommend the use of the bottom feed pull mode to optimize paper handling and print quality.
- To insure optimum print quality, 16~22 lbs (60~83 g/m²) is recommended for graphic printing.
- In multi-layered paper with carbon, the carbon is equivalent to a sheet of paper.
- "Weight in pounds" represents the weight of 500 [17×22 inches (432×559 mm)] sheets.
- The printer will handle multipart papers up to 0.013 inch (0.32 mm). Up to 4 copies of 14 lb. chemical release paper can be used.
- When using multipart forms, rear feeding can be used up to 2 part forms. For 3 or 4 part forms, we recommend bottom feeding for optimum print quality.

Appendix E

2. Single Sheet

Width: 4~16.5 inches (102~420 mm)

Height: 5~14.3 inches (127~363 mm)

Weight in pounds (g/m²): 14~24 (53~90 g/m²)

Note:

- Paper should be within operating temperature and humidity ranges at least 24 hours prior to use.

3. Envelope

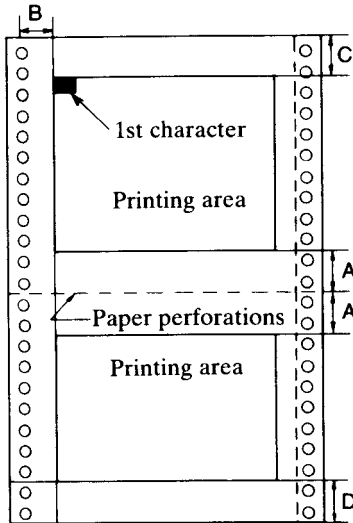
#6 and #10 size envelopes are recommended. Since envelopes vary in size, paper weight and construction, we cannot guarantee print quality and paper handling for all types of envelopes.

Note:

- To optimize print quality, printing should not occur in areas where the edges overlap.

Printing Area

1. Fanfold paper

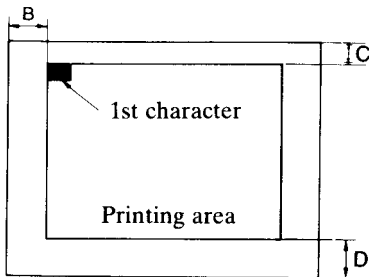


	Push	Pull
A	1" (25.4 mm)	
B	0.7" (17.8 mm)	
C	0.7" (17.8 mm)	5.7" (144.8 mm)
D	1" (25.4 mm)	

- A:** Value A indicates the area near the paper perforations where the quality may not be optimum.
- B:** Value B indicates the minimum distance between the sprockets and first printable character. (When the left tractor is set on the left end and the margin is set to 0.)
- C:** Value C indicates the area from the top edge of the paper to the top of the first printed character.
- D:** Value D indicates the position where paper out is detected and printing may not be optimum.

Appendix F

2. Single sheet and Envelope



	Single Sheet and Envelopes
B	1.5" (38 mm)
C	0.7" (17.8 mm)
D	1" (25.4 mm)

- B:** Value B indicates the minimum distance between the edge of the paper and the first printable character. (When the left paper guide is set to the left end and the margin is set to 0.)
- C:** Value C indicates the area from the top edge of the paper to the top of the first printed character.
- D:** Value D indicates the position where paper out is detected and printing may not be optimum. (When printing on envelopes, do not print on area where edges overlap. Print quality may not be optimum.)

Glossary

ASCII:

“ASCII” is an acronym for “American Standard Code for Information Interchange”. In ASCII, each character has a unique code.

BASIC:

BASIC is a commonly used microcomputer programming language.

Baud (baud rate):

Baud is a unit of data transmission speed between computer devices. Can be but not necessarily equal to bits per second.

Bidirectional printing:

Processing speed is increased by bidirectional printing. That is, the printer prints right-to-left as well as in the normal left-to-right manner.

Binary:

Binary is a numbering system using the two digits of zero (0) and one (1).

Bit:

Bit is an abbreviation for “binary digit (0~1)”, and is the smallest unit of information used by a printer or computer.

Buffer:

Buffer is an area of memory which stores data temporarily.

Byte:

Byte is the unit of information used by a printer or computer. One byte is equivalent to eight (8) bits.

Appendix G

Character set:

Character set is the set of characters, numbers, and symbols available for printing.

Control codes:

Control codes are commands from the computer to the printer that are non-printable characters. They are used to control printer functions. (See Control Codes on page 4-1.)

cpi:

“cpi” is an abbreviation for “characters per inch”, and means the number of characters printed in one horizontal inch.

cpl:

“cpl” is an abbreviation for “characters per line”, and means the maximum number of characters printed on one line.

cps:

“cps” is an abbreviation for “characters per second”, and means the number of characters printed in one second.

CR (Carriage Return):

“CR” is a control code that returns the printhead to the left margin.

Decimal (Dec.):

Decimal is a numbering system composed of 10 digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Default:

Default has two meanings: one indicates the previously set conditions or settings executed when the power is turned on, reset or initialized; and the other indicates the original settings when shipped from the factory (FACTORY settings).

Double strike printing:

Double printing is a print quality enhancing mode which uses a double strike with two passes of the printhead, feeding the paper $\frac{1}{180}$ " (0.14 mm) between the first and second pass (in Epson mode only).

Double high printing:

Double high printing makes the height of a character twice that of a normal one.

Double wide printing:

Double wide printing makes the width of character twice that of a normal one.

Download character:

Download character is a character which the user can design. (See Section 5.2.)

Draft:

Draft is one of three print qualities available on the KX-P2624. Draft mode uses a minimum number of dots per character to maximize printing speed.

Emphasized printing:

Emphasized printing is a print quality enhancing mode done in one pass of the printhead at half speed, allowing horizontally adjacent dots to be printed producing a darker character.

Escape (ESC) sequence:

“ESC” is a control code that begins most printer commands. The characters which follow the “ESC” are interpreted as command, rather than characters to print.

Emulation:

Emulation means to operate like another printer.

The KX-P2624 can emulate the Epson LQ-1050 or the IBM Proprinter XL24E.

Fanfold paper:

Fanfold paper has regularly spaced sprocket holes on the left and right sides and pages are separated by a perforation between each sheet. May also be known as computer paper or tractor paper.

FF (Form feed):

“FF” is a control code that advances the paper one page.

Font:

Font is a style and size of type designated by a family name.

Appendix G

FORTTRAN:

FORTTRAN is one of many programming languages. It is used primarily in scientific applications.

Function:

Function allows you to determine how the printer will operate.

Hexadecimal:

Hexadecimal is a numbering system using the 16 digits, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E and F.

Initialization:

Initialization means to reset the printer to the initial startup condition.

Interface:

Interface is the connection between the two separate systems, such as the computer and the printer. A parallel interface transfers data one character or code at a time, and a serial interface transfers data one bit at a time.

I/O:

“I/O” is the symbolic notation for “Input/Output”.

Item:

Item is a sub menu of the main menu (see menu on page G-5).

Letter Quality (LQ):

LQ is one of three print qualities available on the KX-P2624. LQ mode increases the number of dots per character to improve the print quality but decrease the printing speed.

LF (Line Feed):

“LF” is a control code that advances the paper one line.

Liquid Crystal Display (LCD):

LCD is a display to show the messages which guide the operation or it may show the error messages (see page 9-4). The message is composed of 16 characters at most.

LSB:

“LSB” is an acronym for “Least Significant Bit”, and means the rightmost position in a binary number.

MACRO memory function:

This feature allows the KX-P2624 to easily save and recall a particular combination of functions, even if the power is turned off.

Menu:

Menu is a list of topics from which you can enter to select the desired conditions or settings. The Function mode in the KX-P2624 is composed of a main Menu and Item-menus (Sub-menus). (See page 3-10.)

MICRO LINE FEED:

MICRO LINE FEED function allows you to feed the paper by one micro line ($1/180''$). (See page 3-4.)

MSB:

“MSB” is an acronym for “Most Significant Bit”, and means the leftmost position in a binary number.

OFF LINE:

OFF LINE is the condition in which the printer can not communicate with the computer.

ON LINE:

ON LINE is the condition in which the printer can communicate with the computer.

Overline printing:

Overline printing produces a continuous line above the characters, using the first pin of the printhead.

Appendix G

Parallel interface:

See interface on page G-4.

Parity:

Parity is a method for a computer and printer to check the accuracy of data transfer.

PASCAL:

PASCAL is a commonly used microcomputer programming language.

Perforation:

Perforation indicates the tear position on the fanfold paper. (See page F-1.)

Pitch:

Pitch is the number of characters which will print in one inch. Pitch is equivalent to characters per inch (cpi).

Platen:

Platen is the metal plank provided as a backing for the paper when printing.

Printer drivers:

Most of today's off the shelf software programs use printer drivers to control printer functions. These drivers contain the software codes your software program uses to access printer features. With the printer driver installed, you will seldom need to know any of the KX-P2624 commands.

Proportional spacing (PS):

Proportional spacing is a printing method of adjusting the character space in which a character is printed. A "w" will take up more space than an "i".

Protocol:

Protocol is the set of rules permitting communication between a computer and printer when a serial interface (RS-232C) is used. It covers polarity, baud rate, parity, data length, start bit and stop bit.

QUIET mode:

QUIET mode is a helpful feature of the KX-P2624 which reduces printing noise.

RAM:

RAM is an acronym for “Random Access Memory”. It is the part of the printer’s memory in which data is stored, control codes or download characters are to be printed. RAM is cleared when the printer is turned off.

ROM:

ROM is an acronym for “Read Only Memory”. It is the part of the printer’s memory in which predefined characters and operating information for the printer are stored. ROM is not cleared when the printer is turned off.

Self test:

Self test is a method for testing the operation of the printer. (See Self test on page 2-22.)

Serial interface:

See interface on page G-4.

Shielded Cable:

Shielded cable is a cable wrapped with a special metal around its wires. This guards against radio interference.

Skip perforation:

Skip perforation means nothing is printed in a specified area before and after the page perforation.

String concatenation:

This is the joining of two or more bytes of data into a single command.

Super Letter Quality (SLQ):

SLQ is one of three print qualities available on the KX-P2624. SLQ mode uses a maximum number of dots per character to improve the print quality more than LQ mode but decreases the printing speed less than LQ mode.

Appendix G

Top of Form:

Top of Form is the first line position on the paper. The KX-P2624 has the “Top of Form function” a helpful feature which loads the paper automatically to the designated position.

Unidirectional printing:

The printer prints left-to-right only. Printing speed is slow compared with bidirectional printing. This print method permits better vertical alignment.

Most of the software command descriptions for the Epson LQ-1050 mode and IBM Proprinter XL24E mode are not indexed here. For references on Epson LQ-1050 mode commands, see pages 6-1 through 6-5 in Section 6. For IBM Proprinter XL24E mode commands, see pages 7-1 through 7-4 in Section 7.

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OPTIONS and SUPPLIES

KX-PS11	RS-232C/Serial Interface Board
KX-P19	RS-232C/Current Loop Serial Interface Board
KX-P38	Auto Cut Sheet Feeder (Single bin)
KX-P43	32K Buffer Chip
KX-P155	Ribbon Cassette (Black)